modern world of to-day can give, and he *can* have no more. No man living knows more of the world of "sustained splendour" than the late Prime Minister of England. What a pity it is that he did not in this book make the hero of it say out of it what it is that a very clever man, with boundless means, can get out of it, or make of it. This is not the place to talk about a novel, nor does the book really call for it, because it leaves all the apparatus of wealth dead. It is a book about the most enormously expensive furniture, and one cannot help feeling a kind of contempt for it, from the constant thought of the fact that all the sustained splendour in the furniture of it is simply the mere dead matter in and about which the life in the book moves, but that life does not move it. What a pity it seems, therefore, that the illustrious author of this book, with all his opportunities of knowing, and capacity to influence others, did not go to work, perhaps for the last time, and with all his added experience, and tell us what to do with boundless wealth and power, to possess everything; and tell us, too, what there is in his estimation worth possessing, or seeing, and how far it is an improvement, or progress, on and beyond what they had who have gone before us, or in advance of those in other countries, as India or China, who have not arrived at our stage of improvement and progress. Might it not, from Mr. Disraeli's hand and experience, have been *the* book of the day, a sort of revelation of all that is now possible? It is a book about splendid apparatus, and ends in flat nothing; but surely there is that in it, or not in it, which may be made to subserve an artistic purpose, and guide us to something and somewhere.

Mr. Disraeli's purpose is, then, as far as he has the faculty to exhibit it to us, "modern society" in its very best and highest state, the low elements in it being totally excluded; in other words, the end and result of our modern progress, and without the *means* by which it is attained, is here in a measure placed vividly and brilliantly before those who cannot see it all for themselves, and even before some who can; and here it is that the thought occurs,—is the apparatus, the art, splendid as it no doubt is, which the modern man and woman of wealth can accumulate around himself or herself, an advance, artistically or even usefully, on that which the men and women of old Greece or Rome possessed three thousand years back, or even antique Egypt five thousand years ago? What is all this splendid art which the author of this book writes about so knowingly and lovingly? Art in the abstract is simply the so *working up the raw materials of the world as to approximate them to Nature's own work*. The gilded chairs of a modern drawing-room such as those in which Lothair reclines, and the ivory chairs in which the conscript fathers of old Rome sat, and the marble seats in the Greek theatres, are, after all, but the efforts made to worthily provide such necessary and useful articles of furniture; and the toilet apparatus of a Pompeian lady, and the ivory-handled brush, with its engraved coronet of a modern lady, are but efforts artistically in a like direction; but surely they are as nothing compared with the living beings who use them. Surely it is better to see a self-sustained human being on a burnt-out tar-barrel than a mere dummy and "clothes-horse" in the most splendid of drawing-rooms. It is better by far to be able to kick away the barrel than to lie helplessly in an ivory and gilded chair, with no power to move until lifted out of it by some external force, or to wait till you are advised by some great personage that it is time to take a constitutional walk. Yet of such is this Lothair, the favoured recipient of all that the round world can in these modern and advanced days produce. There is not a scientific society, nor an art society, nor a prosperous trader in pearls or splendours, nor an architect producing plans worthy of "purple velvet case," who is not ready with all he can do to administer to the wants or whims of Lothair. The living question is, *can* he get *anything* out of them?

But one of the great defects of "Lothair," and not the least of them, is the total absence of the common herd of humanity in it, and all that pertains to them. It is all about the higher orders of men and things, and does not condescend to men or things of low estate. This is a great artistic defect, for gold and diamonds themselves would be utterly worthless if there were nothing in the world but gold and gems: so that not only is Mr. Disraeli's book deficient in its main purpose of exhibiting the full advantages of high life and splendour, but as far as the human being is interested and moves in it, it fails by not showing, by way of contrast, what its opposite low life is; and from them to show what is the amount of gain to be got, artistically or otherwise, by high or splendid life, and what it is that low life reduces a man to, or puts him entirely out of the pale of. Mr. Disraeli has shown high-art existence only, with its surroundings, and "sustained splendours." What is low-art existence with the absence of those so much coveted splendours? Are they to be made up for in any way? and if so, how, and what is that which now does it? for human nature, whatever it is, must be, in some way or other, satisfied. All must live, the common as well as the splendid, and all will have art surroundings and ways of getting rid of time some how or other. Lothair's mind is filled to the very brim by the mere sight of royalty, followed by the imperial presence of ambassadors, not in the gorgeous costume of the Dark Ages, but decked out in mere common-place and inartistic modern "tailoring," containing certainly nothing of anything like a high-art element in it. Is there anything in lower life, or the life of the lowest, which ever does on any occasion fill its mind and soul to the brim? Well, there is, as there must be, or humanity would die out altogether. Would that Mr. Disraeli had said something about it, if only to show what the world is made of. In the obscurer parts of London, not west but east, there are "splendours" of gas, glass, gold, jewels, coloured stuffs, and everything,—to wit, "gaffs," theatres, such as they were in Shakespeare's day,—places full of sustained splendour, and sound, and of people to fill them; but of which it is evident Mr. Disraeli knows nothing, and which, if he did, he would probably despise and loathe. But, alas! for the fallibility of man, even when leading the House of Commons; for it so happens, we speak from actual eyesight and personal and active experience, that all and the whole of the splendid apparatus of furniture, crystals, and wonders of which he speaks actually does exist in duplicate in the far-off and dismal regions of which we speak. It is a most wonderful fact, that if you go into a modern West-end drawing-room, and look attentively by daylight at each individual article of furniture in it, from the carpet on the floor to the crystal lustre hanging from the ceiling, and from the smart be-brassed stove to a wine-glass, and then go down East, and look into some den of poverty and helplessness there; or, better still, into some shop filled with the scourings of such places, you will see precisely the same things,—only cheaper. Why, the magnificent lustre in the corner gin-palace was cast from the very same mould, and sold by the same firm! The wine-glass and the gin-glass are the same articles. If you wonder at the cheapness of the cotton handkerchief and at the splendour of its monster flowers, you will be told that it is just as good as one in silk, for which you may sigh, and was actually printed from the same block,—not in far-off India, but perhaps but a few steps off. Wonderful are the things to be found in the far East, not from where are to be met with the spoils of Asia, but in Shoreditch! What a pity it is that Lothair did not travel there for a day before going so far as he did. Why, the fact really is, though the late Premier does not know it, that of all the trumpery (looked at artistically) that is to be found in the known world, a full-furnished West-end Belgravian drawing-room contains the pick of it, enormously rich and expensive, but as *art*, as low and devoid of real artistic skill and thoughtfulness as are the articles to be found in the unknown East.

What a book, then, on "art" would this have been had its wonderful author gone but a few hundred yards east of Temple Bar, and looked about him, before travelling so many thousand miles only to miss it, and to labour under the impression that "sustained splendour" is only to be found in Belgravian mansions; and to labour, too, under the still more fatal idea that these splendours are really "art," and artistically impressive and valuable. Of the mere costume, the dainty tailoring which he thinks so much about, and which at times almost overwhelms him, it is not, perhaps, possible to speak in this place; but the time may come, even in Belgravia, when *fashion*, even in dress, may mean something more than mere change from one thing to another, without the slightest reference to form, colour, fitness, beauty, or adaptability of any sort or kind to the human frame, whether of age or youth.

So much for "Lothair;" but there is one observation in it, which concerns the art of the future, not a little noteworthy. The late and present Prime Minister agree on few subjects of human thought, but with one in this book they do, for Mr. Gladstone has himself written a book about it. It is that the Aryan and Semite after all their labours, and works, and wanderings, represented as they are by the "Hellenes and Hebrews," have met and are destined yet to meet and to combine the treasures of their accumulated wisdom, and hence to secure the civilisation of man. So says this clever book, and so says Mr. Gladstone in his account of Homer and his Greeks. Now, if there is one thing more to be wondered at and admired in the original planning of this world than another, it is that of diversity in unity, or that provision that has been made for securing the individuality of the nations of the earth, and in the certain fact that each one of these nations has a course and a progress of its own, and an interest of its own; and that so far from anything possible to be got by "amalgamating peoples" or "fine arts," it would seem to be a "law of nature" that they be separate, and left to work out, each one for itself, a civilisation, an individualised humanity, and an art of its own. The Greek is one man, and the Jew is another.

But yet one thing more Mr. Disraeli might have done for the age in which he lives, and in this book he might have sketched it out;—viz., what sustained splendour, worthy of the name, or, in other words, fine art applied to humanity, ought to be, and really is, when true and as it has been, at divers times in the history of this world. What if, leaving Shoreditch, and its Jews, and Italians, and Irish, in all their despised roughness, to take care of itself and themselves, or to go to merited or unmerited destruction, Mr. Disraeli had pointed out to us what sort of place a modern West-end Belgravian drawing-room would be, if filled, not with mere upholstery and fashionable shop furniture, with nothing to single it out from the commonest but enormous expensiveness, but with real and *bonâ fide* objects of art,—things interesting, each one by itself, as the expression of the mental and bodily powers of the artist who produced it,—*e. g.*, an Etruscan vase? Why, if any lover of this splendour, even Mr. Disraeli himself, not a Lothair, who knows not one thing from another, were to go into the most splendid of modern drawing-rooms, and see the frightful tradesman's bill which would represent its immense value,—say ten, or twenty, or thirty thousand pounds' worth,—and were to discover, up in some obscure corner of it, but a mere broken fragment of Greek, or even Roman art, it is absolutely certain that neither the art-lover nor the author of "Lothair" would think of pausing for a moment, or looking twice at anything else in the whole suite of apartments! Or, to venture on one more and not the least absorbing thought, suppose Mr. Disraeli had but only suggested that if it be desirable by human art and ingenuity and perverseness, to disfigure and disguise human nature thoroughly and effectually, it is but necessary to be dressed up in the newest and most "improved" of modern tailoring and millinery: the more fashionable and costly it is, the more certainly and surely and completely is the feat performed!

THE STRENGTH OF IRON.

INSTITUTION OF CIVIL ENGINEERS.

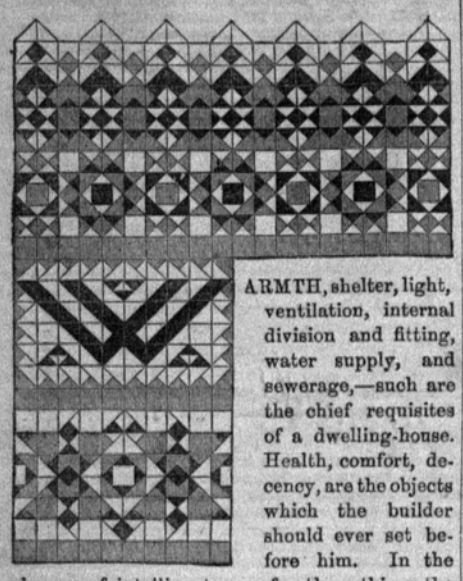
At the meeting on May 3rd, Mr. C. B. Vignoles, President, in the chair, the paper read was "On the Strength of Iron and Steel, and on the Design of Parts of Structures which consist of those Materials," by Mr. George Berkley.

The author stated that the strength of wrought iron varied with the quantities of work involved in the production of the form of the material tested. This was proved by the fact that a bar of iron 1 in. square, which would break with a strain of 26 tons, would, if drawn down to the form of wire $\frac{1}{10}$ of an inch in diameter, bear a strain of 40 tons per square inch. The strength to be relied on in practice would probably be best represented by the minimum strain that 1 square inch would bear without rupture, and by the amount of stretch which would take place in a given length before it broke. Iron could be obtained, at the current market rates, which would bear the following strains:—For plates, an average breaking strain of 20 tons per square inch, and a minimum breaking strain of 19 tons per square inch, and an average stretch of 1 in. in 12 in. lineal. For ⌊ and T irons an average breaking strain of 22 tons per square inch, and

The Builder.

VOL. XXVIII.—No. 1429.

Bad Building.



ARMTH, shelter, light, ventilation, internal division and fitting, water supply, and sewerage,—such are the chief requisites of a dwelling-house. Health, comfort, decency, are the objects which the builder should ever set before him. In the absence of intelligent care for these things the cot of the labourer degenerates to the level of the wigwam of the savage, or the lair of the wild beast. It can bear no comparison, as an architectural product, with the pendent nest of the weaver-bird.

Beyond these, which may be the result of mere building, we want æsthetic propriety. A dwelling-house, architecturally designed, should not only fail to offend the eye by its ungraceful lines, or its unredeemed poverty of surface, but it should give a sense of pleasure to the intelligent observer. It should afford evidence of thought, of skill, and of good taste. It should act as an educational element in the life of its occupants. It should, by silent contrast, condemn all that is sordid, squalid, and makeshift. It should be such a building as it would be impossible to mistake for a magnified pig-stye.

It is possible that a more steady and successful attention might have been given to these great requirements of domestic architecture, but for the weight of another consideration, which few can safely neglect. Cheapness is unfortunately a most important desideratum. So much is this the case that, like Aaron's rod, its voracious energy too often devours all the rival elements. "Learn to build cheap: all earthly graces will follow in their proper places," or, if they do not follow, so much the worse for them. Such might be the motto inscribed (it is inscribed for those who know how to read it), on many of our modern groups of houses.

We speak, on the present occasion, almost exclusively of the dwellings of the poor. For them, necessarily, economy of construction is a leading element. Luxury of ornamentation would be out of place. It could only be at the expense of some more valuable requisite. And yet it is in this very class of buildings that the moral teaching of architectural propriety is most important. If we regard, as we should do, the architect as a silent but yet eloquent moral teacher, it is precisely his very poorest clients who have the most need of his ennobling lessons.

In old time the architect spoke to the poor man with a voice louder and more melodious than any that echoed from the pulpit. He reared before his eyes the House of God. He pointed his thoughts towards heaven, by a graceful and lofty spire. He hung in the air above him towers rich in clustered tabernacle-work, or pierced with luminous tracery. He arched over head a miniature resemblance of the firmament, which seemed to be a solid crystal vault, spangled with shining stars. He clustered his shafts, and shot out his fan-shaped groins, in emulation of the natural net-work of the forest. He pierced his solid walls with slenderly-mullioned windows, till the white transmitted light became intolerable to the worshippers. Then, in defence of his art, he called on the glass-worker to emulate the craft of the painter. He subdued the unwelcome glare by *grisaille*, by yellow stain, by all the heraldic pomp and historic glory of purple, and crimson, and green, and azure. And thus, in stone and in glass, he wrought out many a noble poem, which stirred the hearts of those who were altogether unable to spell out the language in which it was made immortal.

In considering the past and the present position of architecture, it should not be forgotten that we are unable to distinguish how much of the effect of ancient architecture is due to the very element of age. There can be no doubt that antiquity, as such, has its distinct effect upon the imagination. In reading the poems, in studying the art, in admiring the architecture, of our predecessors, we revert to the cradle of our own thoughts. The voice of the past is always poetic, even when it no longer is considered to be musical. It is so because it is always more general, more allusive, more allegorical, than contemporary speech. With the descent of mankind, and with the increase of knowledge, language becomes more precise, more scientific, and less poetical, generation after generation. What is the case with language is the case with all the expressions of human thought. And thus a cathedral of the fourteenth century, or a castle of yet earlier date is surrounded by a mythical halo which no contemporary building can wear to our eyes, although it may, long hereafter, to those of our descendants.

While, then, we feel bound to acknowledge with some satisfaction the change which the last quarter of a century has seen effected with regard to our views as to contemporary ecclesiastical architecture, and even as to taste in buildings in general, whether in streets or in country localities, we anticipate but little educational advantage from this influence. With but few illustrious exceptions, our architects themselves are too uninstructed in the history and in the capabilities of their art to make it a vehicle of elevated moral culture. For the most part they are paralysed by the spells of the demon of cheapness. A pernicious substitute for the golden rule has been introduced in our time. It has not yet been inscribed in copy-books, or stuck up in our houses in spider-legged little oak frames, blazoned in ill-conditioned church text; but it is made by many the rule of life, notwithstanding. It is the gospel of some men in high places; or, at least, it is the formula by aid of which they clomb to the seats which they so long and so bitterly envied. It is the maxim to buy cheap and sell dear. That is the golden rule. Much good it has wrought us.

But, leaving aside the question of the æsthetic proper, let us look at that which lies before us at the present day. If economy banishes ornamentation, there is yet left for us the beauty of well-adapted structures. Everything that is well done has a beauty of its own. The cheap is not necessarily the nasty. On the contrary, by the time that the play is played out, it will appear that the nasty is never really cheap.

It should be observed, in passing, that, under our present social condition, economy is as it were double-distilled. It is raised far above proof; its effect is intensified and aggravated by the different steps which intervene between the the different steps which intervene between the desire, on the part of a landholder, to build a house, and the completion of the house on which he decides. But the future proprietor has to count his own cost. He has to decide on how much he can spend,—to reckon what return he may fairly hope to receive for his outlay. So far we hear nothing but the voice of prudence. The unwisdom of the man who began to build, and had not wherewithal to finish, is matter of moral statics from the time when people were accustomed to dwell very contentedly in tents. So far, then, so good.

For the next step comes in one of the improvements, if such they are, of later times. Our friend has decided to build—let us say—a dozen cottages for his farm labourers or his factorymen. He is prepared to lay out so much money for the purpose. Will that be enough? he asks. Quite enough, is the reply.—How shall I be sure of that? Nothing more simple. Contract with a builder, and the thing is done.—So far, again, so good. There is no doubt that a practised builder will tender, for a given sum, to erect a much more substantial and ornamental set of buildings than the capitalist would obtain if he had to go himself into the market for materials and to superintend the activity of his workmen. Thus far, again, we hear nothing but the voice of prudence.

But the next step goes rather aside from the straight path. The capitalist is not content with getting value for his money; he wants to get the outside value,—the uttermost farthing: therefore, instead of selecting a tradesman of unimpeachable character, and quietly arranging with him the terms of an equal and just contract, he advertises for tenders. In they come, by the dozen. The best man stands aside in disgust; the second-best man tenders a trifle cheaper than he fairly ought to do, for the sake of obtaining employment. How about the third-best and the fourth-best, and those following after him? How about the thoroughly reckless scamp? Why, in sober fairness, unless the advertiser gives notice that he will not hold himself bound to accept the lowest tender, the scamp, if he can produce the security of other scamps like himself, will have a *right* to the contract. The proprietor saves 15 or 20 per cent. on paper. He becomes the unenviable owner of buildings that are worth nothing. Economy peeps out of every hole and every crevice, and laughs at him to his face. The foundations are on the slip; the bricks are misshapen; the timber is soppy and unseasoned; the paint blotches and blisters; the glass distorts the external prospect into a worse than Chinese perspective. An army of rats ascends from the untrapped drain-pipes. The slater's footmarks leave dribble-holes for the rain, always in that part of the roof against which the wind beats most fiercely. The chimneys are so roughly finished as at once to smoke, to draw downwards instead of upwards, and to collect volumes of soot for discharge into the rooms at inappropriate times. No door closes; no bell rings; no lock shoots. Water-pipes are afflicted with dropsy, and exude unwholesome damps; ill-made plaster comes off in patches; gas, if gas be laid on, pervades and permeates every room. Conversation in the kitchen, varied to a sharper key than is pleasant by some of those agreeable incidents, becomes distinctly audible in the sitting-room, or wakes the baby, to add to the din, and the inhabitant bewails the day on which he was beguiled, by an offered economy of a few pounds of annual rent, to inhabit a cheap house.

We have spoken of but one out of the many sources of wretched work in building. We have referred to the master-scamp alone, to the cutting contractor,—needy or unprincipled, as the case may be. But we must remember that like takes to like. The master-scamp has an unfailing tendency to surround himself with other scamps, each more hungry, more inefficient, more cutting than himself. The timber mer-

chant must live, so must the brickmaker, so the painter, the plumber, and the glazier, the ironmonger, and so on. Hear what a working man, or at least a representative and good friend of the working man, says on this point. Says Mr. G. Shipton, the secretary to the Amalgamated Society of House Decorators, "From these combined elements of evil there arises another most deadly and pernicious in the extreme, I mean the class of needy unprincipled employers who have sprung into existence and infest our trade, simply because to an employer it is excessively remunerative. Thus any person having a few pounds to start business commences in obtaining, by peculiar means, and underhand methods well known in the trade, the influence of the servants to some gentleman, and in the first place by cleaning the windows, slopping out basements, washing paint, doing one-coat work, &c., and by making themselves generally useful for any purpose, finally obtain the work to be done in the grand staircase, dining-halls, and even drawing-rooms. . . . . At last the honourable and respectable firms, by further reducing the required skill, education, and judgment to conduct good works down to a base level within the scope of the meanest intellect, give fresh opportunities to the needy employers to compete against them, and by their underhanded influences of course more successfully, and still further demoralise the taste of the public.

Against a state of things thus eloquently described in the language of truth, it is, indeed, time to make a stand. And the one feature of the case which tends to give most confidence as to the results of effort in the right direction is the utter wastefulness of inferior work. That waste, indeed, is of things more precious than gold or silver. Health, comfort, brain power,—the great elements at once of individual well-being and of national wealth—are squandered by that neglect of the laws of honesty and of common sense which is so evident in the greater number of our low-rented houses.

In this, as in all other cases which demand reform, the first thing is to obtain full, accurate, and appropriate information. To compel the builder to erect houses fit for human habitation, we must teach the occupants what careful skill can really place within their grasp. Something has been done, and is doing, in this respect among ourselves. But it is to our French neighbours that we owe the most valuable and most accessible information on the subject of the elements of industrial building that shall be at once reasonably cheap and reasonably good. Attention has been turned to the subject in Paris far more systematically than in London. The Emperor of the French, not content with the transformation of picturesque, old, unsavoury Paris, into its present costly magnificence, has tried his own hand as a poor man's architect. The taste, however, of one rank of life is rarely that of another. Habits differ with the difference of habitual occupation, and the requirements of the wage class, the small tradesman, and the more freely-spending folk of the lower and middle classes differ as much as do those of men of different nationalities. Thus the Emperor's home for the poor man is not altogether to the poor man's taste. He will be his own architect. He thinks that he knows far better what will suit him than the most anxious thought of the considerate occupant of the Tuileries can enable H. I. M. to arrive at. With universal good sense and good taste the Imperial architect has endeavoured to accommodate his poor brother. If the latter has a plan to suggest, it shall, at all events, be tried. We have not space at the present moment to enter into the details of this most honourable and interesting competition, but we propose to give full information to our readers on a future occasion.

Reverting, then, to the considerations with which we commenced, let us summarise those qualities which are demanded for the seven requisites of even the humblest human dwelling.

First, as to shelter. It is requisite that walls and roof, doors and windows, should be not only weather-tight, proof against pouring or drifting rain and violent gusts of wind, but further that they should be bad conductors of heat, so as to avoid chill and save fuel in winter, and keep out the undue heat in summer. Further, they should be non-absorbent and washable, both within and without. The sanitary importance of this requisite is of the very utmost degree.

For light, it is necessary for health, and especially necessary for the successful rearing of children (unless the poor creatures are to be given the key of the streets), that the windows should be of proportionate size, glazed with fair glass, and that the house should be so arranged with regard to them as to avoid dark nooks and corners, which are too apt to become the seed-plots of disease. Nor can we hesitate to deplore the economy which fails to complete the window, especially in the sleeping-room, with a solid wooden shutter.

Warmth and ventilation are intimately connected, although, in our present style of building, they are regarded as antagonistic. In even the bettermost sort of English houses ventilation is for the most part only effected in virtue of the scamping and non-fitting of doors and windows. The subject is of the utmost sanitary importance. The introduction of flues for the admission of air, which may, by a proper arrangement, be warmed in its passage, enter the rooms at an adequate temperature, and escape laden with the products of respiration as well as of combustion, ought to be made legally imperative. Our wasteful open fires, our ill-built chimneys, and our ill-constructed grates and stoves, are all so many premiums for dirt, waste, and discomfort. Intelligent precaution would entirely alter this portion of our domestic disarrangement.

The internal divisions and fittings of a house exercise as much influence on social welfare and happiness. Due separation of the sleeping from the living apartments, and of both from the accommodations for cooking and for cleanliness, are essential. Nothing can tend more to break down the instinct of modesty, and to lower and degrade the daily life, than the want of such decent accommodation. Again, proper cupboards or closets, distinctly fitted for the well-known and universal requirements of cottage life, are requisite for tidiness, cleanliness, and comfort. At the same time they must be so constructed as to be readily thrown open to the light. Dark, crooked, un-get-at-able nooks must be avoided, as haunts of dirt and of vermin. The washable character of every fitting must be borne in mind. All absorbent matters, in small or densely-packed houses, more especially, have a special faculty for imbibing miasma, evil odours, and the seeds of disease of all kinds, and for giving them freely forth without losing the power of continued reproduction. Much discomfort, or much cost in furniture, may be saved by due provision being made by the builder for the universal wants of the occupants.

As to water-supply and sewerage, the conditions of the town and country cottage may widely differ. For the latter, the main point may be to regard the purity of the well, and to consider how far the earth-closet system can be satisfactorily applied. For the former it is important to avoid lead pipes, cisterns, or fittings. The principle of constant supply, with a protection against waste by the use of pipes of a very small bore, should be regarded as essential. And for the sewerage the importance of depending upon the regular action of a fixed supply of water, which is under the control of the engineer, and of carrying off by surface or other proper drains the irregular floods caused by the uncontrollable rainfall, and avoiding the undue dilution of unavoidable manure, should never be lost sight of. The mere fact of realising the importance of these seven elements of health and comfort, and of keeping their attainment constantly in view, would tend, more than almost anything else, to the improvement of the future dwellings of our industrial classes.

HOMERIC ARCHITECTURE: THE PALACE OF ULYSSES.*

THE position of a *thalamus* of Penelope on a level with and just beyond the *megaron*, explains how she overhears all the treacherous talk of the suitors over their cups in the "*megara* [here plural] of the men." It seems to be in this same lower thalamus that while she is in private discourse with Eumæus and her maidservants (xvii., 541) she hears from the megaron the well-omened echoing sneeze of her son. It is not inconsistent with this that in the first book she hears the song of the harping Phemius perfectly from her upper apartment (i., 328).

In the twenty-first book it is certainly from the thalamus where she has been within earshot of the suitors (xx., 387) that she proceeds by the lofty stair (*climax*) of her *domos* (xxi., 5) to ascend to her "most secluded chamber [*thalamos eschatos*] with the oaken threshold" (*druinos oudos*), a muniment-room and treasury, and brings away the bow of her absent lord,—the power to bend which she proposes to her suitors,—so will she yet once again play with and deceive them, as qualifying test of her future husband.

The father and son, in anticipation of their desperate enterprise, have already, after the departure of the suitors for the night, removed all arms from the walls of the megaron, where they have been hanging ever since the departure of Ulysses for Troy. The nurse, or now rather housekeeper, Eurycleia, by their order keeps the women who have to clear up in the hall, in the *megara*,—here equivalent to the women's apartments beyond the stone threshold;—she shuts (locks) the doors of the "*megara*, well inhabited," while the pair carry in—it does not at present appear distinctly where, but clearly into some apartment accessible from the megaron—the helmets, shields, and swords. Athene herself gives light to the work, carrying a golden lamp and lightens all the place—(xix., 37)—"the walls of the *megara*, the beautiful *mesodmai* [frames of the panels?] the pine beams and lofty columns;" and this is the most detailed statement we have of the constructional members of the apartments. A store-room almost as important as a treasury, but in constant charge of Eurycleia is mentioned in the second book, where Telemachus descends into the broad, high-roofed thalamus of his father—a cellar, therefore—from what part of the house does not appear; but doubtless and naturally beyond the megaron, as he has to await his mother's retirement to rest before removing stores (ii., 358). Wine and oil are here stowed away, with chests of raiment (*κητὸς*), gold, and brass. Then we have notice of the mills where the women ground the corn, not remote from the *megaron*.

The test of the bow is to consist, not merely in power to string it, but also in using it with such dexterity as to shoot an arrow through a series of twelve iron instruments—they are called axes (*πελέκεας*),—set upright in the ground. What might be the form of these otherwise—the female attendants of the Queen bring them down in a case (*ὄγκιον*), (xxi., 61)—it is not easy to guess, and at present does not matter. As regards their arrangement, Telemachus plants them duly upright, in one accurately straight trench, and presses down the earth about them (xxi., 122). He then stands upon the threshold and attempts, or pretends to attempt, to bend the bow. We learn afterwards that they were set up within the limits of the palace (xxi., 262)—the *megaron* of Ulysses. The *aule*, as an open courtyard, is the place that would admit of the trench required; and it would seem that it must have been the threshold of communication between this and the *megaron*—the *melinos oudos*—upon which the attempting archer took his stand. Otherwise, from the *laïnos oudos*, he would have a longer shot by length of *megaron*, but to shoot through the opposite door.

At a sign from his father, he lays it aside, just as he could have succeeded. The suitors all try in vain, proceeding (*ἐπιδίξια*) from the position of the *crater*, or mixing vessel; and as the wine circulates—not from right to left, as passed from one to another by moderns, but from left to right, as carried round by the wine-bearer of the ancient feast. In vain they endeavour to render the weapon more flexible by anointing it with fat melted at a fire they have lighted on the spot (*ἐνὶ μεγάροισι*). While they are thus futilely employed, the oxherd Philœtius and swineherd Eumæus quit the *oikos*; Ulysses also goes out of the *domos* (the equivalent use of the phrases is noticeable), and as soon as they are outside the portals of the *aule* he reveals himself to them—tested before,—certifies his identity by a scar, and claims their loyal and zealous aid. Eumæus is instructed, in case of any objection on the part of the suitors, to place the bow in the hands of its master; then to order the women to fasten the doors of the *megaron*, cutting off so the connection between the *megaron* and the *thalamoi* behind by closing the doors on the threshold where Penelope so often had appeared, and by closing which Eurycleia had already before excluded the women, and to keep within and quiet, whatever disturbance they might hear in the enclosures of the men (*ἀνδρῶν ἡμετέροισιν ἐν ἕρκεσιν* = andronitis). Philoitios, at the same time, is to lock and secure the main outer portal of the *aule*, which he does, as we have

* See p. 438, *ante*.

seen, with a ship's spar. All this is accurately performed. Penelope, in the mean time, having retired, on the injunction of her son, at the height of altercation with the suitors, who are indignant at the suggestion which she favours, as well as Telemachus, that they should be brought into competition with a beggar, albeit he would be excluded from the prize. The queen retires to her upper chamber, to be speedily sent to sleep by Athene. Throughout this scene, as previously, Homer adjusts her conduct and expressions with such dainty delicacy that all is perfectly natural; yet the reader knows as little as Ulysses can know, whether (*περίφρων*) Penelopeia suspects or believes the beggar to be her husband, knows not whether to believe or suspect it, or has no thought whatever on the point.

Ulysses strings the bow with ease, twangs it as a lyrist a new string, and, seated as he is, sends an arrow through the steels unerringly. The position of his seat, we have been told (xx., 258), Telemachus had now assigned him, a proper, but modest seat, within the megaron, and by the *laïnos oudos*, thus opposite the door between the megaron and aule. Telemachus, at a signal, seizes sword and spear, and takes his place beside the *thronos* of his father, who, stripping off his rags, leaps to the great threshold (*μέγαν οὐδὸν*) (xxii. 1), which implies,—as this threshold is certainly the *melinos*,—that he traverses the megaron; he shakes out the arrows from the quiver before his feet, and launches the next into the throat of the chief offender among the suitors, Antinous. The slaughter so commenced proceeds apace. The victims turn to the walls for arms, only to find them stripped and bare, draw their swords, seize the tables as shields, and encourage each other to force by a rush their ruthless enemy from "the threshold and the doors." Every arrow carries a life; but in anticipation of their exhaustion Telemachus seeks arms for themselves and the pair of servants in the *thalamos*, where his weapons were deposited (xxii., 109), and so the four stood armed with helmet, spear, and shield. This thalamos must either be the same as his sleeping-apartment, or, at least, like that connected with a set that could be entered from the *aule* (i., 425), and therefore at the command of those who held the threshold intermediate between *aule* and *megaron*; it appears, indeed, by what follows, to be the same to which the night before they had transferred the arms from the megaron.

From the megaron there was one other exit only, an *orsothyre*, or sallyport, "in the well-built wall" (xxii., 126), the sequel shows, at the suitors' end of the apartment; and by "the extremity of the threshold of the well-based megaron," the threshold occupied by Ulysses, there was a way or passage into a lane (*ὁδὸς ἐς λάυρην*) apparently external to the palace, secured by well-fitted folding-doors (*σανίδες*). One suitor proposes to ascend by this sallyport (Why ascend? we ask;—was the megaron on lower level than the aule? This could scarcely be), and give the alarm to the people without; but the attempt is renounced because "the fair portals—*thyretra*—of the aule are very contiguous, and the mouth of the passage (*στόμα λαύρης*) so confined, that one resolute man could there obstruct any number." Ulysses, indeed, has placed the swineherd on the spot to watch the passage—*ὅδος* (xxii., 129).

The passage to which this *orsothyre* admits will be consistently interpreted as a service passage between the wall of the megaron and external wall, issuing into the aule by a passage, and into an outer lane, by a door near the end of it.

Melanthius, the ill-conditioned and disloyal goatherd, who is with the suitors, as he has abetted their worst courses all along, ascends by the orsothyre to the thalamus, where he has divined that Ulysses and Telemachus had deposited the arms, and thence brings supply to the still surviving suitors. This thalamus was thus on an upper story reached from the service passage mentioned. It is described as *ἀνὰ ῥῶγας μεγάροιο* (xxii., 143).

This disaster is a consequence of the negligence of Telemachus; he owns that he had left the door ajar,—we presume when he brought the arms thence very shortly before. He now bids Eumæus "to close the door of the thalamus, and observe who is the traitor, Melanthius or one of the women."

This suggestion that the women who have been excluded by the closed doors at the stone threshold may still have supplied the arms implies that the service passage had, as is reasonable, communication with the women's department beyond the megaron. This, in fact, gave the indispensable access not only to the aule and its main door, without traversing the megaron, but also admitted the household, when necessary, to such a thalamus as that where the arms were deposited, and also to others on this side. Thus it was that Ulysses, sleeping in the prodomus, had an opportunity of seeing with indignation the women-servants going out to join the suitors, their paramours. In the first book the bedchamber of Telemachus is described as "a thalamus of the very beautiful *aule*, built lofty, in a position conspicuous, or rather affording a general overlook." The description implies that it is accessible from the *aule*; and the attendance of Eurycleia, that it is so also from the women's side. The instruction to fasten the thalamus has to be deferred; but Eumæus catches sight of Melanthius, which he possibly might from the further end of the passage, and reports. Ulysses undertakes with his son to confine the suitors to the megaron, while Eumæus and Philoitios proceed to the thalamus. Melanthius is already searching the recesses,—the *muchos*,—of the thalamus for arms, when the two herds take post, one on either side of the entrance by the *stathmoi* or door-posts: as he comes out laden they start forth, seize, and drag him by the hair into the thalamus, throw him down, draw back feet and hands, and strap them together; then, looping him with a rope, draw him to the top of a high column close to the rafters or beams. The rope seems to be thrown over a beam that extends from one column to another, or from wall to column.

The herdsmen then arm themselves,—had they for this merely gymnastic exploit taken off the arms in which we have seen them already equipped?—"close the shining door,"—(the same phrase 201, as at v. 156),—and rejoin the princes.

The fight recommences. Athene, for a few moments in the form of Mentor, stimulates Ulysses, and then flies upwards in form of a swallow, and perches on the *mslathron* (*αἰθαλόεντος μεγάροιο*) (xxii., 239),—properly the beam blackened by smoke of the hall fire,—and hence sometimes used like hearth, as equivalent of hospitable house, and here at least implying a covered roof, with escape for the smoke.

The suitors in vain discharge spears,—six of them together,—at Ulysses alone, in position at "the first doors" (*ἐπὶ πρώτῃσι θύρῃσιν*), (xxii., 250), a new title for the doors between *megaron* and *aule*. Minerva made all effectless and futile,—one struck the door-post, another the door, another the wall. Every spear returned by the party of Ulysses is fatal, and the rest retire to the recess or extremity,—the *muchos* of the *megaron* (270). The same intercharge is repeated, and with the same marvellous and unequal results. Then Ulysses and his son close with their opponents; the goddess on high from the roof (*ὑψόθεν ἐξ ὀροφῆς*) (298), the roof that we inferred, displays the maddening ægis,—they scatter and fly like a herd maddened by the brise, and are slaughtered in all directions (*κατὰ δῶμα*) about the hall.

Phemius, the minstrel, and Medon, the herald, both guiltless, and only consorting with the suitors under compulsion, are spared. Phemius had stood still holding his lyre, close by the *orsothyre*, hesitating whether he should fly from the *megaron*,—evidently by the *orsothyre*,—and sit by the altar of Great Jove Herceius,—that is in the *aule*,—or embrace the knees of Ulysses. He decides for the last, and setting down,—still carefully,—his lyre between the crater,—that this is one in a certain position at the extremity of the *megaron* we learn from xxi. 146, and a thronus,—he succeeds to be spared as guiltless. Telemachus intercedes for him, and also for Medon, if still unslain. Medon creeps out from his hiding-place under the raw (*νεοδαρτον*) hide of an ox. Ulysses laughs—a little, we suppose, at the figure he makes,—and bids both go forth from the *μεγαροι*,—now in the plural, *θύραζε*,—through the door, and sit in the *aule*; there, accordingly, they take seat by the altar of Great Jove, glancing every way, expecting death every moment (xxii., 378).

The chamber searched through and every suitor found to be slain, Telemachus shakes the door of the megaron to signal Eurycleia (394), who opens it and sees Ulysses, bloody from head to foot among the slain, like a lion after feasting on an ox.

At command, she summons the female servants,—twelve out of a total of fifty,—who have intrigued with the suitors and disgraced and insulted her authority and Penelope. These first, under compulsion, carry forth the dead and place them under the *aithousa* of the well-fenced *aule*, "pressing on one another" to relieve the weight of their burdens (v. 387), by the doors of the *aule* (xxiii., 49), and then with water and sponges cleanse the seats and tables. Telemachus, with the two herdsmen, scrape the floor (*dapedon*) of the well-wrought room (*πύκα ποιητοῖο δόμοιο*) with hoes (*λίστροισιν*),—there is no decisive hint whether the floor was paved or of wood,—and the women carried away the dirt and deposited it without (*θύραζε*). When all has been set in order, the wretched girls are taken out of the megaron and confined in a narrow space whence there was no escape, between the *tholos* and the fence of the *aule*; there Telemachus, varying from his father's instruction to slaughter them with the sword, declares that it is by no clean death that the lives shall be taken who have insulted his dignity—his mother—and comforted the suitors, and with the cable of a ship—fitting it to a lofty column of the *tholos*—he drew them up and hanged them all. "Nooses were round the necks of all of them that they might most miserably die, and they quivered their feet for a time—a very short time indeed" (xxii., 470). We may probably be justified in inferring from the reference to an unclean death,—or if this means no more than privation of what semblance of honour there is in death by the sword, from the name and position of the tholos,—that it represents the place of accommodation necessary even to palaces.

Lastly, Melanthius is brought forth by the *prothyron* and *aule* (474)—by the prothyron and then to the aule—that is, by that portion of the *aithousa* of the *aule* that formed the prothyron of the megaron. There he suffers the cruel mutilations that too much resemble modern vengeances of kings—the execution of Babbington, or of Colonel Harrison, or even of rebels of the '45 on Kennington common (*τετέλεστο δὲ ἔργον*) (479). The work is complete, and the work done; sulphur, "of ills the remedy" (481),—sulphur and fire are brought to purify "the megaron and domos and aule" (494); and so all is prepared for general recognition by his household,—the other women admitted at once are at once effused in confiding joy and congratulation—and above all by Penelope, who, more collected, more wary, more wise, withholds her full recognition from the basely-clothed and, indeed, metamorphosed husband, is not convinced by the sign of the scar, which she only knows by hearsay from Eurycleia, and then only flies into his arms when, fresh from the bath, re-clothed, restored to proper majesty by Athene, he responds to her challenge, and reveals his knowledge of their common secret, the concealed construction of the bed which he himself, in building his thalamus, had made an absolute fixture, working it into and about an olive-stem that was growing and rooted in the earth when he commenced, and that he left so until he had entirely closed and covered in his chamber.

CONCERNING LUNATIC ASYLUMS.

IN conformity with the general custom of the heads of the various structural departments of the public service to outline the chief requisites in the classes of buildings over which they preside, the Commissioners in Lunacy now distribute a pamphletful of suggestions and instructions likely to be useful to those about to build or remodel lunatic asylums. Besides their own long list of recommendations concerning sites, construction, arrangement, and plans, they make an accompanying gift of a second pamphletful of suggestions relating to the sewerage, drainage, and water supply, drawn up for them by Mr. Rawlinson. Persons in quest of information as to what a lunatic asylum should be like in its structural arrangements, have now, consequently, official general guidance on many points; and those in charge of such establishments may find many items of instruction that they can make of good account.

And what are the official requisites in a lunatic asylum in the year 1870? Several of them are merely sanitary precautions that every architect would take on building a gentleman's house. In the choice of site, for instance, the suggestions are those that an architect would advise for any considerable residence. But, on the other hand, there are instructions with which it is imperative to be specially acquainted. Every four patients should have, the Commissioners stipulate, not less than an acre of land,

if practicable, to afford them means for agricultural employment, exercise, and recreation; these acres should lie to the south of the asylum, that they may be in the sun and not in the shade of it. Again, the locality should be within easy access by railway or other public conveyance, for the convenience of friends visiting the patients, and for the supply of stores; and not more than three miles from a town, so as to be able to take advantage of the water and gas supplied to it, taking care, however, that the grounds are not overlooked, or intersected, or even surrounded by public walks. Forty gallons of water per patient per diem, are considered sufficient; but the quality must be good, and ascertained by analysis, and the materials used for pipes and cisterns determined by the information yielded by it.

In considering the accommodation required indoors, architects may reckon that, out of every hundred patients, fifteen will be sick, twenty will be recent and acute cases, requiring also special provision, and sixty-five ordinary-working, quiet, and chronic cases. There must be infirmaries for the sick; small reception-wards for newly-admitted patients, whilst their cases are under scrutiny for classification; dormitories, with single rooms adjoining for special care of suicidal and epileptic patients; and accommodation for at least three classes of ordinary male and female patients, with their attendants. Three stories in the building are not objected to, provided the uppermost story be set apart for sleeping accommodation, and the living-rooms, as far as possible, kept on the ground floor, in the southern aspect; and all offices, store-rooms, committee-room, visitors' rooms, and porter's room and entrance kept on the northern side. Cottages or other simple buildings are considered desirable for working patients of both sexes; those for women to be erected near the laundry, and those for men near the workshops and farm buildings. The chief buildings destined for general use, such as the chapel, dining-hall, kitchen, scullery, laundry, workshops, and store-rooms, should be made at the first large enough to meet a possible increase in the number of patients. The chapel may be isolated—indeed, should be so; but the dining-hall must be near the kitchen, and, at the same time, available for amusements.

Coming to the actual arrangements for the every-day life of general patients, the Commissioners suggest that every ward should have a day-room on the ground floor for aged, infirm, and excited patients especially, of not less than 40 ft. superficial dimensions for each patient, unless there be wide corridors, of more than 10 ft. in width, when the 40 superficial feet may be made up between the two. The associated dormitories must contain 56 ft. superficial for each patient, and the separate sleeping-rooms 63 superficial feet. The rooms intended for the sick should allow rather more breathing-space; and rooms intended for the sick to sleep in should have one-third more cubical contents than others. Each infirmary must be provided with a small kitchen, with a cooking-stove; and there is yet one more requisite for the unfortunate sick. Each division of the establishment must have a mortuary, consisting of two rooms, easily accessible from the infirmaries.

The officers' residences are duly cared for. The medical superintendent must have good accommodation either in a central part of the asylum, or near enough to it to be connected by a covered way, with a kitchen and other domestic offices for his sole use. The assistant medical officer, the steward, matron, and chief attendants must have suitable apartments of moderate extent placed near the chief scenes of their duties, without, however, private kitchens. The domestic servants are associated with such patients who work in the kitchen.

The staircases are recommended to be so placed that the medical officers and attendants need not retrace their steps to get from one ward to another. There should be no winders to the stairs, or long flights, or well, or other facilities for suicides or accidents.

Horizontal and lateral fire-proof construction, the Commissioners say, should be adopted wherever practicable; but they insist that the floors next below the roof in those parts of an asylum occupied by the patients should be made of incombustible materials; the floors of other sleeping-rooms, day-rooms, and corridors to be of oak, or yellow deal, that they may be cleaned by dry rubbing. The walls can be plastered, or lined with pressed bricks, at option.

Lavatories, with a bath, and water-closets in proportion of one to every ten patients, are required for every ward.

The precautions officially preferred for effecting ventilation are flues taken from the rooms and corridors into horizontal channels, communicating with a perpendicular shaft, where the foul air is to be carried away by the aid of rarefaction, contrived in a fireproof chamber. The official mind contemplates the possibility of building the ventilating flues of inflammable materials, and stipulates that when they are constructed of such,—for instance, quartering lathed and plastered,—they should be kept at least 20 ft. from any furnace, smoke-flue, or shaft; this intermediate distance to be of fire-proof materials. Smoke-flues carried up through any of the main walls are required to have a hollow space round them, to prevent the transmission of heat from them.

In the matter of the disposal of the sewage, it is suggested that it should be distributed by gravitation in a fresh state over the land. And for the best mode of doing this, the Commissioners refer inquirers to Mr. Rawlinson's instructions, which, as we have indicated, they issue with their own. On turning to these, we find a complete treatise on sewage, drainage, and water supply, abridged, to meet only the necessity of its application to institutions similar to those under consideration, into about fifty short canons; moreover, illustrated with nearly as many diagrams, showing sections of brick sewers, filter-beds, manholes, ventilating-shafts, and the like. Mr. Rawlinson not only details every step that should be taken to ensure the thorough working of his system, but points out imperfect ways of carrying it out that would utterly frustrate its simple mode of action, and the dangers that are possible to be met with in its execution, with the best means of guarding against them. The pith of his instructions concerning sewerage, however, comes to the familiar this:—

Main sewers, of commensurate size, should be laid out in straight lines and true gradients from and to well-considered points, without the use of right angles, with ventilated manholes, and flushing and ventilating arrangements at each principal change of line and gradient. Where earthenware pipes are used it is well to line the trench in which they are laid with clay puddle, and to see that the joints are water-tight, and in sandy soils impervious to sand. When brick sewers are used they should be made of bricks moulded to the radii, and set in hydraulic mortar, or in cement. Sewers and drains, whether of equal or unequal dimensions, at all junctions and curves should have extra falls. Drains should not enter buildings, nor be ventilated into flues within buildings. Surface inlets to all pipe drains should be protected; and sewer outlets should have the same care taken to prevent wind blowing in, and so driving sewage gases back. The form of sewer outlet recommended as efficient to remove solids, sediment, and flocculent matter is among the objects figured. Manholes should be made easy of access from the surface to admit of inspection. The most approved form for these, with ventilating chamber and charcoal basket, is also figured. Danger, in deep trenches, must be looked for from quicksands, loose earth, bog, or made ground; and guarded against by close timbering and packing up, and either by leaving the timbers in the trench, or removing them with the greatest care.

For water-pipes, Mr. Rawlinson recommends cast iron, and for cisterns boiler plate, or cast iron. Wrought-iron service pipes, and earthenware pipes, where not liable to pressure, are preferable to lead. The care required for forming conduits, tanks, and wells, is dilated upon minutely. An opinion respecting the value of sewage is thus positively given:—

"Sewage contains the elements of every field or garden crop which is grown, and, compared with solid manure, there are advantages in using fluid sewage. The water of sewage in dry weather is alone of great value. 224 gallons (1 ton) of sewage, in summer, worth about twopence compared with Peruvian guano at 11*l.* per ton.

Sewage may be applied to common grass, to Italian rye-grass, and also to root and vegetable crops.

The earth possesses the power of extracting and absorbing from sewage all the manure it contains, if the dressings, in volume, are proportioned to the area, to the depth broken up, and to the quality of the land. Sewage-grown herbage increases the volume of milk cows will give, and improves the quality of the butter. Sewage may be applied to land throughout the year."

Lunatic asylums are just now in rather unfavourable repute, owing to several cases of broken ribs that have been produced in the carrying out of processes in vogue for quieting restless, paralytic, pauper patients. At a meeting of the Pathological Society, Dr. Thompson Dickson recently presented some bones from a paralytic patient, of forty years of age, which were remarkably soft and fragile, to show how easily they could be broken. An impression of too much roughness, or too little regard for soft and fragile bones, however, still remains. Many will be, doubtless, surprised to find that the commissioners have considered so many points in the housing of unfortunates, whose bones meet with so little tenderness. A little more breathing space and elbow-room, and more provision for amusements, beyond that occasionally to be had by the transformation of the dining-room into a hall of entertainments, would place an asylum, constructed according to their suggestions and instructions, almost upon a level with any bygienic establishment. Where return to health, mental and physical, is the general aim, a detached hospital for any epidemic that may break out among the patients should, as well as these items, be stipulated for in more stringent terms in the next edition of the instructions, and then well-wishers of the afflicted would have but few more constructional improvements to urge.

NEW TRAVERSE STREET FROM THE STRAND AND HOLBORN TO THE NORTH-WESTERN RAILWAY.

FROM east to west, extending eight miles, our city is permeated by streets and roads, which, although winding, give scope for its enormous population; Oxford-street and Holborn being the widest, the most central, and direct; Piccadilly and the Strand the more devious; both lines converging in a sweep round St. Paul's,—not because there is no open for their direct junction, but that a heavy iron railing meanders round the cathedral, and a wooden barrier stops the way. Oxford-street presents a direct line of suitable width, about three miles in extent, from Uxbridge-road to Furnival's-inn. Along this route the greatest improvement has been effected—first, by pulling down the block of insulated houses called Holborn Bars, but most by bridging over the Fleet valley, as effected by the corporation, in an unequalled style of liberality. In strong contrast, however, with this, the Temple Bar is allowed to stand in ruin, and obstruct the still more important highway of commerce, the last of the corporate barriers of free intercourse; but so soon as the long-pending question of the Courts of Law is decided, that too must give way (like Cripplegate) in the march of improvement.

What the public really wants is a line of intercommunication between the Strand and Holborn—one struck out so as to allineate with the best north-western route, through the W.C. district, and leading to a railway station, by a wide, long, and distinguished thoroughfare.

In the plans of the new Law Courts some allusion has been made to the necessity of enlarging Serle-street into Lincoln's-inn-fields, and thence perhaps to widen *Great Turnstile*, so as to give a one-sided approach. It is difficult, however to see how this line could be drawn, of sufficient latitude to the Strand, southward, without impinging on the site already secured, which is little enough for a building that ought to be national, and creditable to the skill and taste of the day.

On the other side of the plot selected a line of street might be drawn through the worst slums of our great centre, that could be effected with as little cost, and that would form the most convenient causeway from north to south, whilst it would reclaim squalid shambles, and transform them into an ornament to the whole vicinage.

Lincoln's-inn-fields, with their fine array of vigorous plants and shrubs, will quadrate with the proposed north elevation of the Law Courts, at less than 160 ft. distance. The spacious roadway on the west side is but 110 yards distant from Holborn, through Little Turnstile, one half of that passage being already of sufficient width. Then continue the street from the south-west angle of the fields in a straight line southward to the Strand, just opposite Norfolk-street—the distance is but 170 yards; thus there will be only 225 yards of demolition to permeate the New Inn, part of Newcastle-street, Houghton-street, and Holles-street, Clare-market, Gilbert-street, and Portsmouth-street, the vilest of costermongers' quarters. Upon such grounds, the works of reconstruction and the formation of a new street would be comparatively inexpensive, and, at the same time, give health to a region which has hitherto been the dark *retiro* of law-

yers. The line of chambers on the west side of the old inn would, by these means, be saved the din of traffic, while the Elysian character of the fields would be preserved; and, so far as concerns the Law Courts, it would suffice for *their* necessities.

The thoroughfare entering Holborn at New Turnstile, 100 ft. eastward of *Kingsgate-street*, should cross that street diagonally in the direction of Upper King-street, necessitating the demolition, in part, as far as the north corner of Lower King-street, a distance of 150 yards (but this only in case an extension of the line may be thought expedient), so as to form an opening and vista of the noblest line of the N.W. district as far as Camden-town, for a further distance of two miles. Its course would be Southampton-row, Russell-square, Woburn-place, Tavistock-square, then by St. Pancras Church, by the great North-Western Railway, and so onward. This would form at least one happy issue for the construction of traffic, leading to an important, well-built, and *quadrilaterally arranged* portion of the metropolis.

On the south of the Strand, Norfolk-street, which is 49 ft. wide, leads direct to the Metropolitan-station and Temple Pier; and this, like the three miles of north-west extension, is complete and ready to hand, access to the embankment being provided at an easy gradient for a driftway.

It will be seen that by opening the new street for only 170 yards, the thoroughfares of Norfolk-street and Lincoln's-inn-square (west side), will be utilised, and, as it were, revealed for public traffic, between the Embankment and Holborn; and that by a continuation across Holborn of only 55 yards more to Upper King-street, the *straight two-mile range* will be brought into play as far as Camden-town. As to the value conferred on the slums of Clare-market and the whole vicinal reticulation of zigzag lanes, there can be no doubt of the remunerative prospects of the change and transformation; no more than of the easement it would give to traffic, together with the respectability, if not dignity, which it must confer upon the Temple and the new Law Courts.

THE FRENCH GALLERY, PALL MALL.

THREE or four pictures by a young Spanish artist, Mariano Fortuny, now exhibited here, have from Paris a high reputation. The principal of them are called,—"the Spanish Wedding," "the Snake Charmer," and "the Carpet Merchant;" and we learn that the "Wedding" picture has been sold for 2,800*l.*, and the "Snake Charmer" for 1,700*l.* That they are works of peculiar merit, few who examine them will deny. The expression given to each figure, the powerful and harmonious colouring, viewed from the proper point of view, are very striking; but the style is not such as we should wish to see imitated: it borders closely on the extravagant, and would speedily degenerate to the outrageous. The pictures actually before us, however, are very interesting, and well deserve a visit.

THE ARCHITECTURAL ALLIANCE.

THE ninth annual meeting of this body was held on Wednesday last, at 9, Conduit-street; Mr. T. R. Smith in the chair. The following delegates were present:—Mr. Rickman (Hon. Sec. of the Alliance), Mr. J. D. Mathews, and Mr. R. P. Spiers, as representatives of the London Architectural Association; Mr. J. R. Botham, of the Birmingham Architectural Society; Mr. H. H. Statham, jun., of the Liverpool Architectural Society; Mr. Thomas Oliver, of the Northern Architectural Association; and Mr. T. C. Hine (Vice-President of the Alliance), representing the Nottingham Architectural Association. Mr. Drew, of the Institute of Architects of Ireland, was also present, as a visitor.

After some discussion, the following resolution was agreed to,—"That the Royal Institute of British Architects be invited to meet the delegates of the Architectural Alliance, consisting of the following allied societies (mentioning their names) once a year, at their annual meetings."

The next subject brought under discussion was the custom, law, and expediency of an architect retaining his plans.

Mr. Hine said his experience supported the universal practice of retention.

Mr. Drew cited a case which occurred forty years ago in Ireland, and which was identical with Mr. Barry's case. The architect of the public Board of Works in Ireland, Mr. Murray, was paid 500*l.* a year, and a percentage of 5 per cent. on all public buildings; he did the work in a public office; his clerks were paid by Government; the Government made a change, and called upon him to confine himself to the duties of the office with an increased salary; he resigned his office, but refused to give up any drawings he had prepared while holding office, and succeeded in retaining his plans.

Mr. Oliver said that, having succeeded in a competition for the North Riding Infirmary, after carrying out the works and upon rendering up the building to the corporation, he was asked by the town clerk to deliver up the drawings. He maintained they were his own property. The town clerk said the corporation would go to law. He (Mr. Oliver) said that if they would not make it expensive he would join them in a friendly lawsuit, for the purpose of settling the principle. The committee, however, dropped the matter, and he retained his drawings.

Mr. Drew said a similar case was that of Mr. Rogers, against whom proceedings were commenced by the town council of Cashel, because he retained his plans. He consulted counsel, who very strongly advised him not to give up a single paper. It was to be presumed that the town council also consulted, and received similar advice, for the matter was dropped. He knew of other similar cases.

Mr. Hine said it was his practice to bind up the plans, bills of quantities, contract, and every paper connected with it, into one book, the custody of which had always remained with him as the umpire between builder and client, without dispute by either.

After a lengthened discussion, the following resolution was agreed to unanimously:—"That, in the experience of the delegates present, the custom of the architect retaining his plans of the buildings which he has carried out has been universally adhered to, and that it is desirable it should be maintained."

The following resolution was also carried unanimously:—"That in the opinion of this alliance it is very desirable that the Royal Institute of British Architects institute examinations in the provinces."

The following officers were then elected in place of those retiring:—Mr. Hine as President; Mr. Rickman as Vice-President; and Mr. Douglass Mathews as Secretary.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ON Wednesday evening last, the President and Fellows of the Institute, gave their annual *conversazione*, at the House in Conduit-street. Mr. T. H. Wyatt received the visitors. The rooms were filled with objects of art, including many capital drawings, and a military band in the lower galleries discoursed excellent music. The attendance was numerous, and the whole passed off agreeably.

DRAINING WITHOUT SCIENCE.

How differently a face looks, painted by two different men. One will make a moderately dirty little boy look "as clean as new paint;" another will make him as dirty as it is possible, by a liberal supply of oil and muddy colour. The processes are always in operation. One runs foul of the other; for either the clean little boy is allowed to trot forth first, with a certainty of a dirty little boy banging into him head foremost; or the dirty little boy is let loose, with a certainty of coming to fisticuffs with some clean little boy. I am not one of those who like to see an old woman step up, separate, and admonish the combatants. I prefer to keep a clear ring and witness a fair fight, admiring pluck as much in the washed as in the begrimed. I have been led into this line of thought by "Gargoyles," "Stagnant Lincoln," and the reply of "A Lincoln Householder." The former makes Lincoln a moderately dirty little boy. I call this a fact. The "Lincoln Householder" makes it a wonderfully clean little boy. I call this a ——. However, I am not going to do the muddy colouring; in fact, my present communication has little or nothing to do with Lincoln or its minster. Upon looking over my notes, jotted down some few months since,—I had never been in Lincoln before,—I find this: "The drainage does not seem so very good." Now, I may remark, that I have become so accustomed to filth in close proximity to noble architectural works, that I question whether I should have troubled to note any fact about drainage unless something worse than usual had struck me or my olfactory nerves. "A Lincoln Householder" cuts any excuse for such a state of affairs from under his feet by denying the existence of stagnant water. I can quite sympathise with him as a householder and tax-payer, and can easily imagine that another rather heavy tax for a thorough system of drainage, in addition to those which he already has to bear, fills him with a wholesome terror. But, who on earth is wild enough to suggest a system of thorough drainage for a place like Lincoln? A hill like that upon which it is built drains itself naturally. This is easily demonstrated; at least, it was to me; for during my ascent of the steep hill (no wrong name, I can assure the infirm), I witnessed some of the good housewives emptying domestic utensils into the surface gutters. The contents of such vessels commenced rapidly finding their own levels by making frothy head for the lower portions of the town. Should the drainage below be no better than higher up, the peculiarly black and greasy appearance of the streets is easily accounted for.

This matter of drainage brings me to my subject. Drain your towns, by all means, but utilise the sewage. Those who are practically acquainted with farming need not be told the vast amount of food thrown into the sea, or, worse still, thrown where it becomes our deadly enemy, poisoning our rivers, plague-smiting all people; evils intensified by another sort of drainage,—the drainage of the country. We have been doing worse than the individual did who killed the goose that laid the golden egg. We have gone madly,—well, say unscientifically,—into drainage. We have found verdant vales not verdant enough; they have borne us crops, but the crops have been all too little for our cravings. We have sought for the place of the lichen and the willow; we have noted the resort of the woodcock and snipe; and in our wisdom we have said, "This is all wrong: bogs do not fill pockets, and will not grow corn well. Improve them off the face of the earth. Search ye out rushes: ay, here is neglect: drain them away." The times of good Queen Bess, with the rush-bestrewn floors and rush-bottomed chairs, are of the past: they may not cumber the ground any longer: away with them and their memories. Drain the land, "reclaim" it, and make it valuable. We have done this with a vengeance. Farm after farm, county after county, has been drained. Swamps bloom; morasses have become gardens; mountain-sides vie with the valleys in fruitfulness,—and will not continue to do so. We have no water; drought has assumed a dreadful and gigantic aspect. Each summer as it comes brings its increasing terrors; each winter its fearful inundations. We have figuratively, almost in fact, laid a coat of impenetrable armour between the clouds and our poor land. The rains of heaven descend; they are hardly allowed to kiss, leave alone embrace, it. Can we hope for fruitfulness? The generous streams fall but to be hurriedly driven into the nearest channel; from the channel to the brook, from the brook to the river, and then—for a flood. The river overflows its banks, and floods a district, bridges are swept away, cattle destroyed, and a small amount of human loss may add slightly to the evils; but we enlarge our bridges, increase our waterway, straighten our rivers, if we can, and pitch into drainage with fresh vigour; and then summer comes again. Wheat gets into ear, with no straw worth speaking of; the hay is "light in the bottom," and seeds before its time; potatoes are as big as marbles, when they ought to weigh half-a-pound apiece; and the town waterworks cut off the supply, and there is no water to boil them.

This water question, so far as we in England are concerned, is assuming a most serious aspect. The architect, as well as the engineer and landowner, is involved in the question. Sites are fixed upon for houses, and houses built, the water supply duly thought of—sometimes; but eventually the river, which has worked a ram, fails in giving a head of water sufficient for the purpose. If a well has been sunk, matters may be almost as bad; the height of the water decreases year by year, until it is looked upon with doubt, is proved unequal to the requirements, and eventually abandoned for a covered "catch" tank.

In out-of-the-way places, where the pipes of waterworks have not yet penetrated, the architect has often been driven to his wits'-end in meeting and overcoming the difficulty of a regular and sufficient water-supply; and unless the subject receive a great amount of attention, his difficulties in this respect will increase. However, he is far from being the most interested party: the question concerns the nation at large.

I said that the thorough drainage of a town, and the thorough drainage of a county jointly caused a great evil, and were directly the cause of epidemics. Our cities are drained as a rule into the nearest rivers: these cities have organised water-supplies; the water falling in the winter is collected into tanks, and the surplus of the rainfall is carried to the sea. Now a natural result follows; we have so drained our country that springs, which have hitherto been unknown to fail, fail now when the dry season arrives,—the rivers become low, and often, were it not for the sewage water flowing into them, almost dry: the result is, that when we want

this sewage washed immediately into the sea, the river is least capable of doing it; the filth accumulates, channels become shallow, currents sluggish, and thus one evil produces another.

In speaking to different farmers upon the matter, I have not unfrequently been told that the springs in certain fields have failed in an extraordinary manner; upon questioning them as to drainage, and pointing out the impossibility of springs supplying water if their supply is cut off by drainage, they have told me that they were thinking of taking up the drainage pipes that had been laid down. This, in some instances, must be done, unless each farm is furnished with water-tanks. Drainage in some counties has proved but poor economy. We have turned our bogs into gardens, and our gardens into deserts. We have been unscientific in the matter. Had we, before draining to the extent we have, calculated the rainfall to each acre, found what each acre required, the necessities of the population, the flow of the rivers, the strength of the current required to retain the proper depth in the channel, and the collateral questions involved, we should have provided artificial springs before destroying the natural. We should then have heard less frequently of floods, of falling bridges, of floating hay-stacks and cradles with babies and cats, of stagnant pools instead of silvery rivers, of fish destruction and poisoning, of dying cattle, of bankrupt farmers, of fever and death.

M. U.

PARLIAMENTARY.

Unemployed Labour.—On going into Committee of Supply, Mr. M'Cullagh Torrens called attention to the continued want of employment in many of the great towns, with the view of inducing the Government to do something for the promotion of emigration to the colonies, and for the cultivation of waste lands at home. He would have, for example, as he said, third-class ships, like third class or like Parliamentary trains; and to every workman paying down 3*l.*, he would give a passage by these ships to Canada. Other members took part in the debate, and Mr. Goschen, in a very able speech, showed, from a host of documents, that trade and employment are reviving at almost all the centres of industry, and that the unemployed are being rapidly absorbed. The revenue returns, he said, show that the working classes are consuming more sugar, more tea, more beer, more spirits, and more tobacco than ever. Those classes are depositing more in the savings-banks and contributing more to the Imperial Exchequer; and there is scarcely an indication on which we can rely that does not point to increasing prosperity throughout the length and breadth of the land. "All the facts," he added, "to which I have referred, leave not a doubt of this—that the distress is not greater than it was a year ago, that it is not greater than it was two years ago, and that it is decreasing. Unquestionably, there is great misery in parts of the metropolis, and local misery elsewhere. The question, then, is—are we to legislate on this subject; are we to go back from the great principle we have always acted upon of leaving the labour market free, of letting labour take care of itself? I contend that we ought not to do so unless a very strong case is made out." He did not deny that there still remained enough distress and want of employment to deserve the attention of the Government; but he asserted that the remedy was to be found, not in reversing all our past legislation, or resorting to extravagant schemes of education, but in removing from our workmen the disadvantages which hampered them in their competition with foreigners, and encouraging the self-reliance and self-dependence for which they were distinguished. Members afterwards spoke both against and in favour of Mr. Goschen's statistics and conclusions, and the debate was adjourned.

Cavalry Barracks.—In reply to Sir C. Dilke, Mr. Cardwell said that no proposal had been made to the Government with respect to the purchase of land in Chelsea for the purpose of cavalry barracks, and he had not thought it necessary to interfere in the matter. This scarcely agrees with what has been stated elsewhere.

The New Law Courts.—Mr. Ayrton informed Lord E. Cecil that questions had arisen of a very complicated character, which would take some time to solve, in relation to the new courts of law, which it was desirable to solve before the plans could be agreed on and produced.

Accommodation for Reporters in the House.—Mr. Ayrton informed Mr. Taylor and the House that his attention had been directed to the character of the accommodation provided in the House for reporters, and he was about to submit the results to her Majesty's Government; and if the plan which he had prepared should be approved, it would be submitted to the House in the special service estimates.

The Kensington-road Improvement Bill.—The First Commissioner of Works has informed the House that he shall postpone this Bill till next session. The matter has not been very well managed, and opposition to a desirable improvement was unnecessarily raised.

The Embassy House at Constantinople.—In reply to Mr. Rylands, the Secretary to the Treasury, Mr. Stansfeld, said that in the event of resolving to rebuild, no contract would be entered into before it had been laid on the table. Should the estimate be laid before the House this session, it would necessarily be a rough one; but in that case he should do his best to make it as accurate as possible.

OPENING OF ARDINGLY SCHOOLS.

THE opening of Ardingly Lower Middle-Class School, of which we gave a view and plan in our volume for 1867, pp. 836, 837, has just taken place.

This educational establishment, which bears the name of St. Saviour's College, is situate on the slope of a hill overlooking the valley of the Ouse, and is visible from the great viaduct on the Brighton Railway, between Hayward's Heath and Balcombe stations. The college is designed to hold 1,000 boys of the superior artisan, or small tradesman class; and, for the small sum of 14*l.* per annum, each boy is boarded and thoroughly educated, the education being based on Church teaching. The institution will be self-supporting. The first stone of the buildings was laid by Earl Granville, on the 12th of July, 1864, and since that time the works have been pushed steadily forward, and are now far advanced. The plan consists of two large quadrangles, the lower one being open on the southern side. The two wings of the lower quadrangle have accommodation for 400 boys in eight dormitories for 50 boys each, the ground-floors being occupied by class-rooms, with masters' rooms at the end. The head-master's house adjoins on to the south end of the east wing. The cross buildings between the two quadrangles comprise the upper and under dining-halls, and the two great school-rooms, which occupy the whole space under the chapel. A tower stands between the hall and the chapel, which is reached by a staircase communicating with the ante-chapel. The upper quadrangle has on its three sides double dormitories for 600 boys, with class and master's rooms, and separate school-rooms for the very young boys. The kitchens and offices stand westward of the dining-hall, and form a distinct quadrangle. The ground falls rapidly towards the south-east; a terrace will, therefore, be carried along the southern front, and the quadrangles kept on one level; below the terrace is a steep slope with a lake at the bottom. The River Ouse forms the south-east boundary of the estate. The style adopted is simple Early Pointed, with alternate two, three, and four light cusped windows in the wings, and three-light traceried windows in the upper dining-hall. The materials are red brick for the walling, and for the windows, arches, dormers, bands, and other architectural features; the local sandstone, which is of a light brown colour. The roofs are covered with brown tiles from St. John's Common. The fittings are of a very simple description; the window-frames and casements are of iron. The sum of 6,588*l.* has been paid for the site, and the estimated cost of the buildings is about 35,000*l.* The architects are Messrs. Slater & Carpenter, of London. The clerk of the works is Mr. Knight, of Shoreham, builder to St. Nicholas College.

The buildings at present erected comprise the two wings of the lower quadrangle, including a portion of the head-master's house, half the cross building, the kitchen, and the offices. These will give accommodation for the head-master and his family, fourteen other masters, a staff of servants, and 450 boys—in all, about 500 persons. The portion of the cross buildings erected consists of the upper and lower dining-halls, but till the chapel is built the lower hall has been fitted up for divine service. This building is 120 ft. long and 62 ft. high. The upper hall has an open roof of Memel timber, stained and varnished. The two wings of the quadrangle completed are each 162 ft. long, 47 ft. high, and 37 ft. in width. The space across the quadrangle, which is covered with turf, is 182 ft. The buildings will occupy about three acres.

The school, which already numbers 250 boys, has hitherto been carried on at Shoreham, houses being hired for the purpose, but the boys will now very shortly take up their residence at Ardingly.

ON THE UTILISATION OF THE HEAT THAT USUALLY PASSES AWAY IN CHIMNEYS.

SIR,—Economy in fuel has been justly for some time a matter of scientific investigation.

It has been well known that heat is given off from the outer surface of pipes, shafts, and chimneys whilst transmitting heat that has been produced in stoves or furnaces, but the quantity of heat in such cases is too inconsiderable to answer the end of warming any apartment through which they may pass. The power of arresting the heat usually lost by passing into the open air, may be greatly augmented (as will be clear to any mind on reflection) by causing the air of an apartment to pass through tubes transfixing such flues or pipes, but in no way communicating with the interior.

For some years past I have thrown my thoughts into this subject, and have conducted experiments, the results of which have shown me that a vast economy of fuel, with other advantages, may be derived through means used for the carrying out of the principle above stated.

I am not aware of the exact proportion of heat that is afforded by fires in ordinary stoves, grates, &c., to the apartment in which they are placed, but I have understood and believe that the proportion is small compared with that which passes away into the open air. It has been stated to be as three to seven. To utilise that heat which would usually pass away is the great desideratum, and I am convinced that this is within our reach to a great extent.

The following are the plans I would recommend, and the objects to be obtained:—

First. Where there is a narrow chimney or shaft passing through an apartment connected with a fire in the same room, or in a lower room, warmth may be communicated by transfixing such chimney with tubes obliquely, so that the air of the apartment passing through from their lower to their upper extremities shall be heated, and passing into the room will of necessity warm the whole air.

On taking possession of a cottage which I had purchased, I found just such a narrow chimney in one of the bedrooms, and for two years by such means this room has been kept warm whenever a fire has been lighted in the room below. This is, however, an imperfect instance of the advantage to be derived from the plan. It will be found that the surplus heat produced by a fire, and which would ordinarily pass away by the chimney, may with great facility, in many cases, be given to adjoining rooms on the same or upper floors, and this may be accomplished,—

Secondly, as follows:—Where a chimney runs upwards, through a wall which divides the room in which the fire-place is placed (connected with such chimney) from another, the superabundant heat may easily be conveyed, instead of going off by the chimney, to the apartment behind the wall. An opening for this purpose may be made at the back of the stove above the fire, and through the wall, into which an earthen pipe may be introduced, of sufficient length to allow an elbow of a metallic* pipe to be fixed, in which a valve or damper should be inserted. From this elbow a flue may be carried upwards, or in any other direction, through which have been inserted small tubes, from 2 in. to 3 in. in diameter, in an oblique direction. This pipe may be carried through the floor to the apartment above and beyond, according to the quantity of heat that may be usually transmitted from the fire beneath.

The size of the pipe may be varied; but that which I have employed is about 7½ in. in diameter. This plan I have put into operation in two instances, and have kept warmed six rooms, during the last two winters, by two fires. The temperature varying, of course, according to the size of the fire, and the external temperature of the air, it may be said that proper pro-

* I have tried a variety of metals, and at present give preference to tinned iron.

vision must be made for the safe transmission through the flooring, although the heat never rises to a dangerous degree; and also the pipe at its further extremity must bend by a slanting elbow into a chimney (in my case it is the same chimney). It must be further observed, that the stoves above alluded to are Romford, or "register," stoves, and that the heat requires to be shut out from the chimney by the register-flap, or by a damper above the fireplace, so as to send it backwards into the pipe.*

Thirdly. The same effect may be produced by building a narrow shaft of brickwork at the back of an interior wall, having a fireplace on the opposite side, through which shaft small metallic tubes, the same as those above mentioned, varying from 2 in. to 3 in. in diameter, are introduced obliquely, the shaft itself communicating with the fireplace as before described, and furnished with a damper. This plan I have carried out by building a brick shaft behind my kitchen fire, which for two years has communicated sufficient warmth to a room behind and to a bedroom above it, the shaft terminating in the upper part of the kitchen chimney.

Fourthly. The object aimed at may be obtained by substituting for the pipe a box of the necessary size transfixed by small tubes either obliquely or perpendicularly, according to convenience, the box having two openings, one for the admission, and the other for the exit of the products of the fire.

A small church, with a high-pitched roof, 65 ft. in length, by 24 ft. in breadth, has been conveniently warmed by this contrivance for the last three years. The stove, which is 15 in. by 17 in. in dimensions, stands out of sight in a small shallow well at the end of the building, surrounded with brickwork; the box through which the products of the fire pass is in length 48 in. by 10 in. in breadth, and 36 in. in depth, and is transfixed by 16 tubes, some nearly horizontal, and some perpendicular. The draught from the stove is made to pass from one corner at the bottom of the box across to an opening at the opposite corner at the top, where it passes into the chimney.

On experimenting with this limited apparatus, I found that the box and tubing did not sufficiently economise the heat produced by the stove, and I thereupon attached a second box, 36 in. by 10 in. by 36 in. in dimensions, and have thereby fairly accomplished the desired end. In the stove coke† is exclusively burned, and each day costs only from 6d. to 8d.

The temperature of the church can be usually sufficiently raised in about four hours. The only observation that I would further add is that this principle, viz., of warming the air of apartments by the surplus heat, which ordinarily passes away by communicating it to the air, by its passing through small tubes, as above described, may be carried out in a variety of ways, as I have proved by making other experiments, and that with proper adjustment it may be made to conduce also to the ventilation of apartments by the external air so warmed in its passage.

As my object is simply to communicate a means of comfort and economy procured at small expense, from which I myself and some of my friends have derived benefit, allow me to make use of your widely-spread journal for this purpose.

JOHN WHITING, M.D.
(Member of the Royal College of Physicians, London).

* The register flap or damper in the chimney may be so arranged as to regulate the quantity of heat communicated to the pipe.

† The damper should be kept open above the fire when there is smoke, and that within the pipe should be closed. I find it best in all cases to employ coke, as it communicates no foulness to the pipes. Heat from gas-burners may in the same manner be utilised as well as purified by an appropriate apparatus.

STEAM CULTURE.

AT a meeting of the Wenlock Farmers' Club, reported in the *Shrewsbury Chronicle*, a paper was read by Mr. Stables "On the Advantages of Steam Culture," &c., from which the following is condensed.

What is the relative cost of steam and horse tackle? . . . . As a principle, allowing a 12-horse-power set to cost 600*l.*, including all etceteras, that amount involves a sum, for interest, of 30*l.* per annum; that is, for the power of 18 horses, with the implements of culture. Suppose that 18 horses of ordinary stamp, should be bought for 30*l.* each, and the implements required in using their powers on the land cost 10*l.* more, we have the amount of 540*l.* for horses, and 110*l.* for implements, making a total of 650*l.*, which commands interest to the amount of 32*l.* 10*s.* Were the extent of land sufficient, and the circumstances of the farm or farms conducive, so that this 18-horse-power could displace the same number of horses, then it follows that no more capital is required to farm with steam than with horses. . . . . The fact must be palpable to the most uninitiated that steam tackle should, with proper care, and if adapted to the work to which it is applied, be worked at a much less rate of deterioration than horses. The steam-horse is heedless of those atmospheric influences which prove so deleterious to the varied members of the animal world. Alike a stranger to attacks of colic and inflammation, and ignorant of all vicious propensities, it uses its wondrous power at the bidding of intelligence, knowing no other will but that of its attendant; and in the development of its strength, it is alike a stranger to galled shoulders and wearied limbs.

The introduction of steam-cultivating tackle into any neighbourhood is a matter of importance not only to the occupier, but to the proprietor. The land is permanently improved by steam cultivation. How is this? Depth of culture tends to increase the depth of the soil. Depth of culture in facilitating the action of the drains; and, making the land more constantly and permanently dry, tends to improve the quality of the soil. While these facts point to increased annual value, the possession of tackle enables a tenant, by increase of crops and by saving of expenditure, to combat with seasons, circumstances, and times; and tends to ensure rent punctually and fully paid. There are many enterprising, industrious, persevering tenants who would be glad of steam power, and whose farms are well adapted, and with such power would make a good profit, but now can but manage to live and pay their way. Maybe their landlord is looking out for money investment, and is glad to get 3 per cent. for his surplus income. Why not invest in the steam-cultivating tackle for the benefit of his tenants? Why not lend them part of the purchase-money of the tackle on the security of the tackle itself? True, there are some occupiers who have little mechanical genius, and who would make little profitable use of a set of tackle. But this is not the case with all, and the principle is the same.

CATHEDRAL RESTORATIONS.

Rochester.—The appointment of the Rev. Dr. Scott to the deanery of Rochester will, it is believed, lead to the restoration and renovation of this cathedral at no distant date. For many years past the funds from the suppressed canonries of the cathedral have been accumulating in the hands of the Ecclesiastical Commissioners, and these now amount to between 30,000*l.* and 40,000*l.* A strong hope is now expressed that the accumulated funds will be expended in improving the cathedral, both internally and externally. The removal of the old block of houses on the south side of High-street has opened up a fine new view of the north-eastern portion of the cathedral. A further improvement might be carried out by still further throwing open this partially inclosed space, and making a road to the eastern end of the cathedral from High-street.

Ely.—Between two and three years ago, Mrs. John Thomas Waddington, of Troyford Lodge, near Winchester, undertook the restoration of the great western portal of this cathedral, renewing the richly foliated tracery of the arches and replacing the entire series of marble pillars. This work was executed by the firm of Messrs. Rattee & Kett, of Cambridge, under the direction of Mr. G. G. Scott. Mrs. Waddington was anxious, at the time, to present a pair of new oak doors to be ornamented with richly-wrought metal work. An objection was, however, raised to the displacement of the old doors, which had been erected by Bishop Eustacius, in the thirteenth century, and an attempt was therefore made to repair them by cutting away all the decayed portions, and inserting new wood. The result, however, was very unsatisfactory and patchy. Experiments were tried of staining the doors, but no uniform colouring could be obtained, whilst the effect of the ironwork on the darkly stained doors was altogether lost. Other experiments were made of painting and gilding the ironwork, which were equally unsatisfactory. The door has been cased with new oak, and the ironwork replaced.

Lincoln. — An interesting experiment has recently been made, with a view of ascertaining whether it is not possible to add to the beauty of the interior of this edifice without the enormous expenditure of restoring certain portions of the fabric, which have suffered from the ravages of time. The pillars which support the arches of the triforium, or angels' choir, have been at some period covered with whitewash, in order to conceal the decay of the stonework. In one portion, above the presbytery, the whitewash has been removed, and the surface of the columns, first smoothed and then rubbed with oil, and varnished. The effect of this, it is said, closely resembles that of polished Purbeck marble, and serves to throw into relief the foliage and tracery with which the arches are so elaborately decorated.

THE GRANITE CHURCH IN ABERDEEN

THE Roman Catholic church of St. Mary of the Assumption, Aberdeen, which was opened on December 20th, 1860, is the largest in the city of Aberdeen, the dimensions being,—nave, internal length, 150 ft.; breadth, 30 ft. 6 in.; breadth of aisles, each 16 ft. 9 in.; total width internally, 69 ft. The aisle walls are 20 ft. high, the walls of the nave 43 ft., and the height from the floor of the nave to the apex of the roof is 70 ft. The nave is divided on each side into seven bays by piers and arches of polished Glasgow freestone, and the church is lighted from the clearstory only by triple lancets above each of the nave arches. Two traceried lancet windows on each side give light to the sanctuary, and there is a large traceried window in the west end of the nave, 15 ft. wide and 30 ft. high, divided into six lights, and having three large circles in the arch. Externally the church is built of the light white granite, from the Kemnay Quarries, Aberdeenshire. The entrance to the church is by a moulded doorway, with polished shafts of grey and red granite.

The tower is at present carried up to the bottom of the belfry-stage, and stands 60 ft. It is now proposed to complete the spire, the height of which, from the ground to the top of the cross, will be 200 ft.; and as the whole structure is to be of granite, to correspond with the present work of the church, it will be peculiar, if not unique. In the lower part of the tower, and opening into the north aisle, there is a small chapel. There are besides three altars at the east end of the church, and one in the west end of the south aisle; large vestries on each side of the sanctuary; and the windows of the sanctuary are filled with stained glass, by Mr. Lyon, of London. There is a large presbytery on the north-east of the church for the resident clergymen; and more recently there has been added a conventual establishment, of very plain description. The church is seated for 1,400 persons. In the nave between the arches, and supported on large moulded corbels above the piers, are figures of the twelve apostles, colossal size, the work of the late Mr. Alexander Brodie, of Aberdeen. The architect of the church was Mr. Alexander Ellis.

NEW BANKING HOUSE, NEWCASTLE-UPON-TYNE.

OWING to the great want of accommodation in the premises occupied by the National and Provincial Bank, in Newcastle, it was a short time ago decided to erect a new building, with architectural pretensions. An expensive site was purchased at the corner of Dean-street and Mosley-street, and the preliminary work having already been accomplished, the foundation-stone has been laid in the presence of a numerous body of gentlemen connected with the company. The new building, which is expected to cost from 14,000*l.* to 15,000*l.*, will be erected from designs prepared by Mr. John Gibson, of Westminster, and will have carved fronts of 86 ft. in Mosley-street and 39 ft. in Dean-street, the entire premises extending to St. Nicholas-churchyard in the rear. Both the fronts are to be constructed of Kenton stone. The building will rise to three stories above the ground-level, the lower story being rusticated. The windows will be semicircular headed, and the doorway will be ornamented with polished red shafts, the arms of the company surmounting the entrance. The windows of the first story will have Ionic columns and enriched pediments; while the two upper stories will be entraced by pilasters and cornice, the frieze inscribed with the title of the company, date of its establishment, and date of

its erection, with blocking, which completes the building. The entrance to the bank will be in the centre of the Mosley-street front. The internal arrangements comprise a banking-room of over 70 ft. long, 30 ft. wide, and 22 ft. in height, being spacious enough for thirty-five clerks. The ceiling of this apartment will be flat in the centre, divided into lozenge-shaped panels, with a groined cove all round. The treasury will be constructed of brickwork, with hardened iron lining, and contrivances for insuring perfect security, the iron safes being of Messrs. Chubb's manufacture.

The contractor for the edifice is Mr. Joseph Elliott, of North Shields; and the work will be carried on under the supervision of Mr. W. Glover, the clerk of the works.

LIFE BY THE LIFFEY.

AN important case, in a sanitary point of view, has just been decided in the Dublin Law-courts, in which a woman claimed and got damages from the corporation for the loss she sustained by the death of her husband, who was employed by the corporation, and who met his death by the foul gases in the Dublin sewers. The culpability of the corporation was fully proved, and the sheer neglect they had from time to time exhibited in not remedying that hideous scandal and disgrace of Dublin, the Liffey and its feculent tributaries.

The case of Anne Loughman *v.* The Corporation of Dublin is really a most important one, and we hope the verdict obtained against the municipal authorities of Dublin will shame them into action in abolishing at once an acknowledged nuisance, by the adoption of one of the methods so often pointed out by us for the purification of the river Liffey.

The Dublin press, some of whose proprietors are aldermen or town councillors, have acted with a suspicious silence in not noticing this law case, because of the example it makes. But enough for the day, as we shall probably next week afford our readers some additional evidence of the sanitary condition of Dublin, and life by the Liffey.

EASTBOURNE PIER.

THIS favourite and prosperous watering-place was on Monday, 13th, the scene of gay festivities in connexion with the opening of the new pier by Lord Edward Cavendish, one of the county members, and son of the Duke of Devonshire. This pier, the opening of which we mentioned last week, was designed by Mr. E. Birch, by whom the first pier of the kind was erected at Margate about sixteen years ago, and who has been the designer and constructor of those at Brighton, Scarborough, Blackpool, and other watering-places.

The new pier when completed will be about 1,000 ft. in length, with a minimum width of 22 ft., increasing to a width of 135 ft. at the head, which is of a triangular form, and provided with all necessary facilities for landing and embarking passengers from steam-vessels and pleasure-boats. The arrangement of weather screens made of glass, as on the Brighton Pier, has been adopted here.

The entire superstructure rests on iron columns fixed into the ground by means of screw piles; and has been executed by Messrs. Head, Wrightson, & Co., of the Teesdale Ironworks.

HULL WORKING MEN'S ART AND INDUSTRIAL EXHIBITION.

THE building, situate in the Corporation Field, is a wooden erection, designed by Mr. R. G. Smith, architect. It has been constructed by Messrs. W. & J. Hall, contractors, of this town. The building, with its enclosures, stretches across the north end of the Corporation field—a distance of more than 300 ft., and it has a frontage to Park-street. Between the building and the street the ground is laid out attractively. In the centre of the ground, opposite the porch, is a large artistic fountain. On each side of the path is an enclosure, with a flower-bed in the centre, and two large stone eagles are also placed in front of the building. The front is stained, and the other portions of the exterior have been painted a stone colour. The central and main portion of the building is 150 ft. long by 50 ft. wide, and 45 ft. high to the apex of the roof. The annexes on each side are 158 ft. long by 30 ft. wide, and 24 ft. high. In the centre of the hall there has been constructed a fountain, and around it have been placed seats for the accommodation of visitors. The fine-art department is at the west end of the north aisle, and is 90 ft. long by 30 ft. wide, and lighted in the daytime, the same as the other portions of the exhibition, from the roof.

THE SMALL BEGINNINGS OF GREAT ENDINGS.

A POOR woman in Constantinople, the other day, was about to go to the upper floor of her living-place to bring down the *mangal*, or pan of lighted charcoal, for cooking; but, feeling lazy—the day was warm—sent her child for it. The child let the pan fall on the stairs, near a window-curtain; and the result of the woman's change of mind was that terrible fire we have all heard of, which has reduced 30,000 persons to destitution, utterly destroying many hundreds of them, and some thousands of houses. If a neighbour had given the poor woman 10,000*l.* not to send the child, it would have been a good bargain.

LAYING THE FOUNDATION-STONE OF THE STANLEY HOSPITAL, LIVERPOOL.

THE Earl of Derby, in company with about 200 gentlemen, has laid the foundation-stone of the Stanley Hospital.

The ground for the hospital has been given by the Earl, and the cost of the entire scheme, which includes a trial of the cottage plan of hospitals, will be not less than 15,000*l.*

In aid of the hospital funds there has been a *fête* of four days at Stanley Park, and the extraordinary sum of 10,000*l.*, free of costs, has been thereby realised.

The principal building is to have a frontage of 300 ft. to the Stanley-road, and will consist of a central building of 50 ft., and two wings of 60 ft. The northern wing will contain a small chapel for the use of the patients, and the southern the waiting-room and dispensaries for out-door patients. The buildings allotted to the in-patients are to be placed at the rear of the main building, and will be erected on what has been referred to as the cottage plan. They are to comprise four wings, each wing consisting of four wards, and each ward will contain five beds, giving to each patient 1,100 or 1,200 cubic feet of air. All surgical cases will be treated on the ground floor, the medical cases being dealt with on the second story. Every accommodation in the shape of bath-rooms and ventilating apparatus has been provided for; and when the plan is complete, it is calculated that there will be space for 176 beds, although at the commencement it is expected only to provide for a portion of these at an expense of 8,000*l.* to 10,000*l.*, and to finish the design as funds may accrue. The part to be first proceeded with will be the main building fronting Stanley-road, which will give accommodation to about fifty in-patients, in addition to the dispensaries for out-door patients. The plans are by Messrs. Wainwright & Son, of Liverpool.

JOHN OF LEYDEN'S CARD-TABLE, MUNSTER.

THIS interesting relic of antiquity, of which we give an illustration, now serves a purpose much at variance with the object for which it is said to have been made. It is now the "Credence-table," for the high altar of the cathedral at Munster. It seems to be of rather an earlier style than that in vogue at the time of the notorious fanatic, who styled himself "King of Munster and Jerusalem," and who took possession of the town of Munster in the year 1534. However, it must be remembered that Gothic architecture continued to be in use in this part of Germany, and remained very pure and free from classicalism, down to a very late date. This table is made of pine wood, and is in an excellent state of preservation.

ST. JOHN'S CHURCH, SCHWÄBISCH-GMÜND, GERMANY.

RECENTLY we gave some particulars of the interesting town Schwäbisch-Gmünd, near Stuttgard, with a view of the doorway of Holy Cross Church there.* Although the town contains now only about 5,000 inhabitants it has as many as twelve churches, ten of which are still used for religious purposes. There are also remains of two others, so that before the period of the French Revolution, when all the religious orders were suppressed here, there must have been at least fourteen churches. Six of these are outside the walls, which would lead one to suppose that originally the town had very extensive suburbs, that have ceased to exist.

We will begin our renewed description of the churches with those that are extra-mural, and the first which will occupy our attention is St. Saviour's. This building is one of the most singular in Europe: it is a small church of two stories, both of which are cut out of the rock; at the south-west angle is a lofty octagonal tower, now crowned by a dome; and at the east end is a kind of open gallery. These are the only portions of this singular building (if it can be called a building) which are not cut out of the solid rock. The lower church is evidently of a much earlier date than the upper one; it is a kind of crypt of very irregular plan. Near the east end is a large crucifix, with attendant figures, about life-size, of the very rudest workmanship: this is probably as old as the tenth or eleventh century. The upper church is probably not earlier than the fifteenth century; it is a simple parallelogram about 50 ft. long by 20 ft., and, like the lower church, is entirely cut out of the rock: it is adorned with a great deal of rude, though late, sculpture; a good old picture of the "Seven Dolours," very much in the style of A. Dürer; and some very bad modern glass. There is an external pulpit, and a series of "Calvary chapels" are placed at intervals along the flights of steps leading to this church.

Two of the other churches outside the walls are quite similar in plan. They each consist of a lofty octagonal chancel, and a low vaulted nave of three bays; the chancel arch is in both cases filled with a metal grill, which in one case is ancient.

Of the churches within the walls three are worthy of notice, St. John's, the Franciscan Church, and the superb Church of the Holy Cross, which we previously described.

The Church of St. John is the most ancient ecclesiastical edifice in Gmünd (with the exception of the lower Church of St. Saviour). It consists of a nave and aisles of moderate dimensions, a tower at the east end of the north aisle, and an apsidal chancel. The nave, aisles, and tower are of a very rich and singular Romanesque character; the chancel is Third Pointed. This church is said to have been in existence in the year 1102, but very little of the present building can date from that period. The remarkable Pseudo-Classical detail of the tower and portions of the nave, the use of the pointed arch, and the great richness of the ornamentation, lead us to believe that the greater portion of the building does not date from an earlier period than the last quarter of the twelfth century or the commencement of the thirteenth.

The tower (of which we now give a view) is a beautiful specimen of the latest Romanesque style. The spire with which it is crowned is covered with green and yellow glazed tiles, which are not older than the fifteenth century. It is probable, however, that the form of the spire is original.

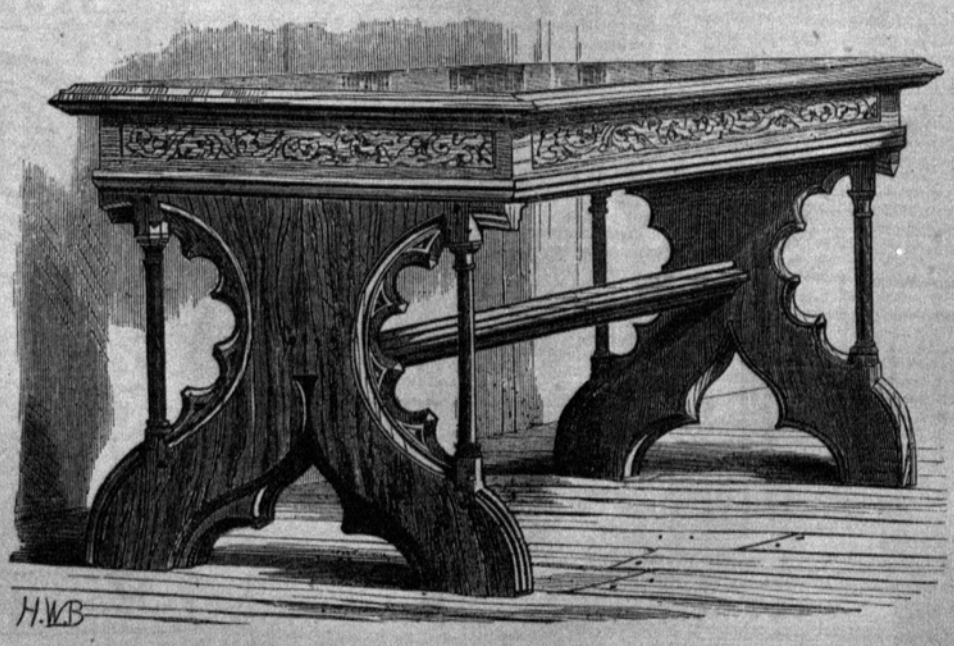
This church is being thoroughly well restored, and all the plaster abominations and trumpery altars and furniture with which it was disfigured during the last century, are being removed, and will be replaced by others more in harmony with the style of the church. The plaster vaulting of the nave is also being removed, and will be replaced by a flat boarded ceiling, restored from portions of the ancient one which have been brought to light. Very interesting remains of ancient decorative painting have also been found under the thick coating of stucco which disfigured the walls of the nave. When the restoration is completed this church will be a gem of late Romanesque architecture. We should not omit to mention the doorways of this church, which are very rich and beautiful. They are adorned with carved shafts resting upon the backs of lions, and all the *tympana* are filled with sculpture.

REFERENCES.

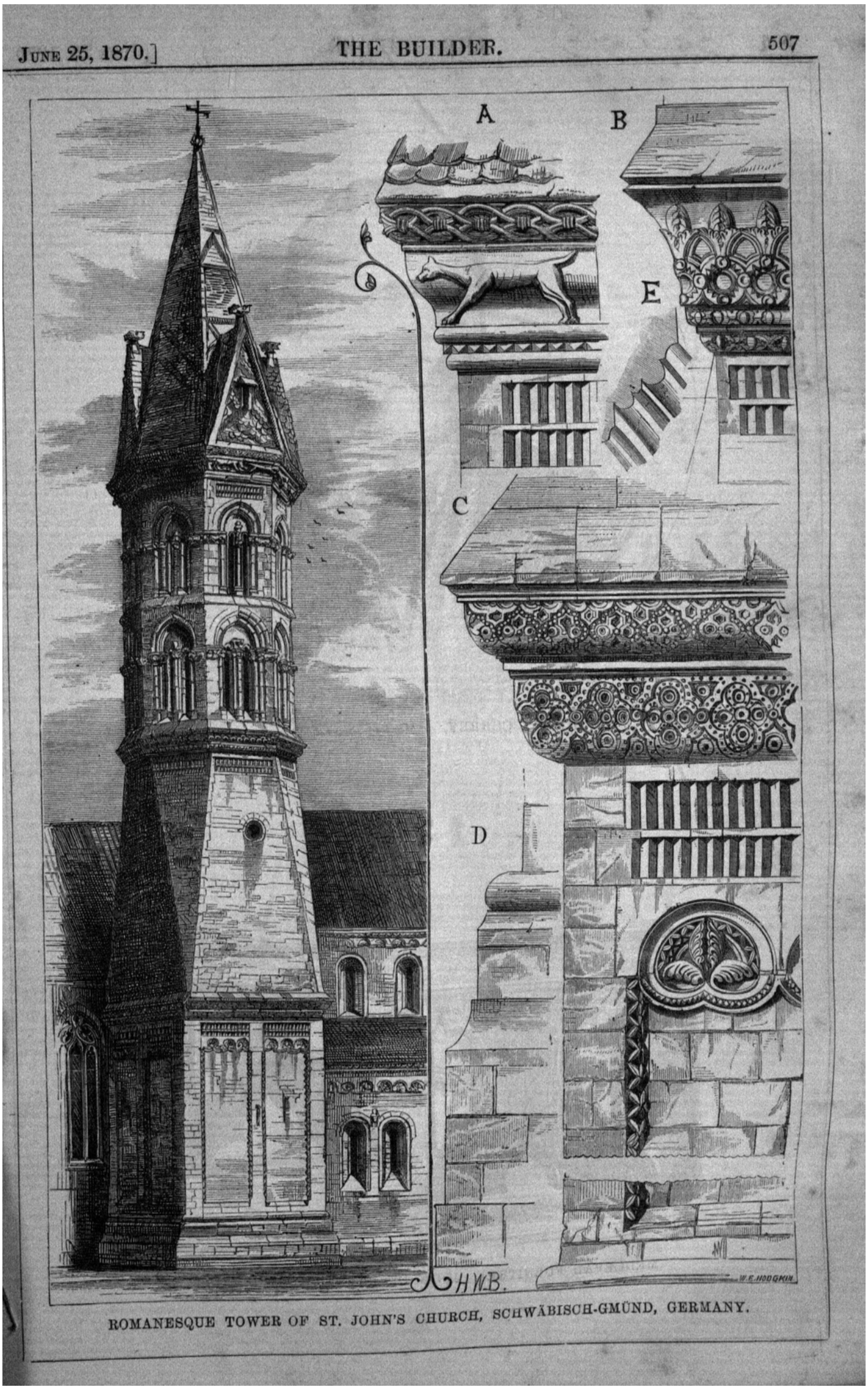
A. Cornice under spire.
B. Cornice above broach.
C. Cornice under broach.
D. Base table.
E. Arch-mould of windows of lower story.

* See pp. 365-367, *ante*.

MR. HENRY CURREY, *Architect of St. Thomas's Hospital.*



MEDIÆVAL FURNITURE JOHN OF LEYDEN'S CARD-TABLE.



ROMANESQUE TOWER OF ST. JOHN'S CHURCH, SCHWÄBISCH-GMÜND, GERMANY.

THE NORTHERN ARCHITECTURAL STUDENTS' SOCIETY.

THE first annual report of this little body (the members at present only number fourteen), reviewing progress, says,—

"On the 14th of December the inaugural address was delivered by the president (W. L. Newcombe), and since then seven papers have been read and discussed, namely: "The Studies of a Young Architect," by W. S. Hicks: "Landscape Gardening," by W. Bedlington; "Decoration," by C. Hall; "Villa Architecture," by J. H. Morton; "Domestic Architecture," by J. Oswald; "Foundations," by G. D. Oliver; and "Timber used for Building Purposes," by E. Thornhill. Besides the in-door meetings of the society, at which these papers formed the principal business, two out-door meetings have been held,—the first at Seaton Delaval Hall, and the second at St. Nicholas's steeple, and the Mining Institute, Newcastle.

The committee remind the members that one of the principal objects of this society is the encouragement of the study of ancient architecture, from the buildings that remain around them; and that the rules require the members to contribute original drawings of such examples.

A WORKMAN ON THE FREE LIBRARIES QUESTION.

SIR,—The recent paper in the *Builder* on the subject of Public Free Libraries will, I hope, be the means of calling the attention of your readers to the present position of that important and national question. The reflection on its perusal must have a depressing effect on those who are anxious for the progress and well-being of the working classes; and it shows that, in relation to the library question, and the intelligence of vestrymen and the masses, in spite of all the boasting of England's greatness, she must, when compared on this question with the smallest Continental state, be called Little Britain. It is to be hoped that no intelligent foreigner reads the reports announcing the failures in different parts of the country to put the Act in operation, or the arguments used against the Act by her free and enlightened citizens, or he will, no doubt, think that England is fast drifting into the senile state, and that in the transition period public spirit is dead, and the people have lost all interest in mundane concerns. The report of Mr. Ewart's committee showed how deficient this country was in free libraries, and how far behind we were twenty years ago in comparison with other countries. At that period every great Continental town had collections of books accessible to all classes. In France, there were 107 free libraries; in Tuscany, nine; in Great Britain and Ireland, one. Thus, in the matter of promoting the intellectual condition of the people by reading, England was then eight times behind what was at that time considered despotic and benighted Tuscany. Turning from countries to capitals, the results are the same. At that time Paris had seven free public libraries; Copenhagen, three. The whole population of Denmark is not much beyond half the inhabitants of London; and yet the chief city,—not larger than a middle-sized English town,—had three public libraries; while London the Great, the mart of the world, with a population more in number than eight capital cities which at that time had twenty-four free libraries, had none; and to-day, there is but one, and that of so little importance as not to be mentioned in the late return. I believe the little institution in Smith-street, Westminster, is not known to one in fifty of the working men in London. Such a condition of things is, among all the disgraces of England, the greatest; and, for her honour, it is ardently desired by a few that it will not remain any longer.

During the last month I read most of the reports of what are called the May Meetings, and, wonderful to relate, this London, which is so far behind in providing intellectual food for the people, but which has more drunkeries and more drunkards than the capitals of all nations, is looked upon as the civiliser of the world. The failure of one mission or the success of another was recounted by a variety of speakers, and yet there were some important social and moral failures within a short distance of Exeter Hall which were not enumerated; and perhaps if the same sort of thing had happened in China or Madagascar, it would have found a place in some mission report, to show the dark condition of the inhabitants. Some time back, a few working men in Islington thought it would be a great advantage to the parishioners if the Free Libraries Act were in force in the parish; and a requisition was presented to the vestry, for that body to convene a meeting of the rate-payers on the 5th of last January. The meeting was held at the parochial school-rooms, Liverpool-road, Islington, and the next morning's papers stated the resolution, "That the Public Libraries Act be adopted," was carried, the working men voting for the Act, the vestrymen and shopkeepers against. So far the ignorance of the workmen had gained a victory over the refined culture of the shopkeepers and vestrymen.

On the 22nd of January, the second part of the business relating to the Act commenced in the vestry, by one of its members moving that the vestry appoint commissioners to carry out the Act of Parliament. The result of the motion created a commotion among the opposers; and, if the account of the meeting in the local press is to be credited, it created a screaming farce, which had not its equal in the days of unreformed Bumbledom. After the farce had been played out, the last part finished with the motion being rejected by 52 to 4; and so up to the present stands the question, in the great *and very highly-civilised parish of Islington*. Another failure was in Shoreditch. It has often been lamented that the workmen in England are behind the workmen in other countries, in so far as education is concerned. It is said,—and the "Reports from her Majesty's representatives respecting the condition of the labouring classes abroad," confirm it,—that our tastes are low, our pleasures degrading, and that our earnings are largely wasted in debasing gratification; and when it is considered how much is provided to debase, and how little to raise, the intellectual condition of the people, there is nothing to surprise any but those who are strangers to the country. Among the many evils caused by the want of free libraries, there is none perhaps greater than the narrow views partial reading fosters. Most of the small tradesmen have their daily pennyworth of paper. It may be Liberal or Conservative. The penny daily paper is too often the whole extent of their reading. Its opinions they take for their guide in public affairs; and thus it is there is so much party-rancour and so little independent thought among the shop-keeping class. My employment takes me a great deal among that class, and I find they are not book-readers. Being somewhat fond of books myself, on going to a house I in general take a passing glance to see if the bookcase is well stocked, and I find that is but rarely the case; and therefore we cannot wonder at the opposition which exists to the establishment of free libraries; for of all distorted visions perhaps mental blindness is the worst and most hurtful to the community. Were a free library established in every parish, that class would be largely benefited, as there are times in the day when they are almost disengaged, and then they could visit the library and reading-rooms, and study the various questions of politics and trades from different points of view, and thus form their ideas on a broad basis, to the benefit of themselves and society. There is another class which might be benefited, for it is to be remembered that the institution would be open to all, and that is, those who are in the habit of borrowing the *Times* at a penny for an hour. Looking at it only from a pecuniary point of view, they would receive a great advantage, as there are 313 working days in the year, and that alone would be 26s., and as the rate is limited to a penny in the pound, it would in most cases be but from 2s. to 8s. They would save in papers alone a good sum, and have the advantage of a free library into the bargain. If one-sided reading is an evil in the class which is a step or two removed from the working classes, it is a still greater injury to the working men, as the leading articles of most of the cheap weeklies give distorted ideas of the habits of the upper classes. The writers in most cases are levellers, who would unhinge and raze the foundations of society, and although they are great at pulling down, it is evident their wisdom would not build up again. It is strange the dupes who believe it is all gospel these men preach do not make a few inquiries to see if their idols are of common clay. If they did it would be found that the proprietors of their favourite papers ape, as far as possible, the manners of those they are always writing down.

The want of books and free libraries is felt among the class of workmen who are called intelligent. In high-class journals and reviews the great questions of the day are discussed in all their bearings, and yet not one workman in a hundred reads them, or knows of their existence, although the articles are often on working men's questions, and are of greater importance to them than to any other class. In the last issue of the *Contemporary Review* a working man,—some, perhaps, might demur to the title,—contributed a paper "On Trade-Unions from the Workman's Point of View." There is no doubt many workmen would like to read it, but, unfortunately, the price of the *Review* is more than they can afford. It is not lent at the stationers' libraries; and I believe it is not to be found in a reading-room in London; so it is with the *Fortnightly*, the *Quarterly*, *Edinburgh*, and *Westminster Reviews*. They are unknown to the earnest workmen, and it is a sad fact they are kept in the dark because their class are too ignorant to appreciate a high-class literature and the pleasure and advantages of knowledge. There are, it is true, some few bright spots in the intellectual desert of England. And I ask, why it is they are not extended to all. Liverpool and Manchester enjoy the feast. And it certainly behoves the people of this metropolis to labour earnestly until the great stigma is removed, and the people have within their reach the same opportunities for mental culture which the foreign workmen possess; and then some hopes may be entertained that the workmen will see the folly of wasting their substance in the gin-traps* of the metropolis, and that they will, when possessing the purest and least expensive of all gratifications, keep pace with the progress of workmen in foreign countries. There are so many points in the question; and as I have merely touched the outlines, I hope you will, sir, think the above worthy of insertion; so that other workmen may fill up the inner lines, and at last we shall be able, by a thorough organisation, to pay with interest those who have so long blocked the way in London.

JACK PLANE.

THE SEWAGE QUESTION.

THE Attorney-General has consented to lodge an information against the Corporation of Birmingham, on the motion of certain residents at Gravelly-hill, for depositing the sewage matter near the outlet, and thus causing a nuisance to the aggrieved persons.

Mr. Purchas, the engineer, has met the Sewage Committee of the Bromsgrove Local Board at the Town-hall, and, the details of the sewerage plan having been settled, instructions were given for the preparation of the working plans and specifications, upon the completion of which tenders for carrying out the work will be at once advertised for.

The select committee to whom the Thames Navigation Bill was referred have agreed to a special report, in which they say:—

"It appears, on the evidence of Sir John Thwaites and otherwise, that the Metropolitan Board have repeatedly had under consideration the best means of utilising the sewage of the metropolis, but that nothing effectual has yet been done, and the sewage still flows into the river Thames. Your committee recommend that immediate attention should be given to the subject, in order that the sewage of the metropolis should be utilised as far as practicable; and, in the mean time, until this can be accomplished, your committee have deemed it expedient to approve the bill which they have reported to the House for preventing any obstruction to the navigation of the river from the flow of sewage from the metropolitan outfalls."

THE DISTORTED STYLE.

SIR,—Some people see everything through a distorted medium. Your correspondent, "J. K.," refers to "the reproduction in costly stone of the toppling lath and plaster features of Old Edinburgh,' now excluding dwellers there from plain substantial houses so much required by workmen, and also, by way of contrast, to the ridgy back, piled deep and high, of the Old Town."

This is apparently a hit at the works of the City Improvement Trust. Now, although the buildings erected under the cognisance of that body are in the old style, they are of strictly stone construction, and in none of them is any attempt made to imitate the half-timber style.

When I hear a man talk of a "plain substantial house," as his idea of a dwelling, I at once have a clue to the amount of art-culture he has enjoyed. According to him, nothing in stone is substantial unless devoid of ornament, and no house comfortable unless rectangular on plan.

* *Memo.*—"Gin" and "snare," or "trap," are synonymous.—ED.

To be perfect, the door must be in the centre, and flanked by an equal number of windows; if the whole are not required for use, then a blank one is requisite for symmetry. Of course, the chimneys must balance also, and all that is necessary to complete the effect aimed at is to get the smoke from them to fly off at opposite angles! (when at school I used to manage this with slate and pencil). Enter this model dwelling, and you find its occupant has no idea of restricting himself to what is plain and substantial in the internal decorations; he reserves what appears to him to be beautiful for his own enjoyment and that of his friends. Marble walls and ceilings; doors of oak, walnut, and maple (?); carpets with roses 2 ft. in diameter; lovely hearthrugs with peacocks depicted thereon; and furniture—why describe it?—of the orthodox type. In fact, our model man prides himself upon being orthodox in everything: the beaten track is the right way: diverge from it and you are anathematised.

The new streets referred to certainly do lack the spirit of the ancient ones, but these were the work of many minds. If various architects had been allowed to design the respective elevations for their clients, subject to the revision of the architects of the Trust, greater variety and more of the spirit of the old streets would most probably have resulted. Victoria-street is a noteworthy example of this; and, although modern, it is one of the most picturesque bits in the City.

DUN EDIN.

ACCIDENTS.

ON the Anlaby-road, Hull, a chapel, now approaching completion, for the use of the Primitive Methodists, has suffered considerably from a gale of some violence. The roof (to a great extent completed) gave way under the effect of the wind, and in one mass, the greater part falling into the interior of the building, breaking the gallery timbers and destroying nearly all the woodwork which had been fixed, and doing very serious damage. The chapel inside appears one mass of broken spars and timbers and iron. The accident, besides delaying the progress of the work, will be a serious loss to the contractor.——While some men were repairing a well at New Crane, Wapping, one of them descended, and when within a few feet of the bottom the whole of the walling of the well fell in upon him. Immediate efforts were made to extricate him, but without the slightest hope of getting him out alive, the well being 60 ft. deep. When the rubbish was removed to within about 40 ft. of the bottom, the sufferer was heard shouting to those above, who redoubled their exertions to save him, and at half-past six the poor prisoner was set free, without a bone broken, but, as may be supposed, very much bruised. There is no doubt of his ultimate recovery.

ELECTION OF DISTRICT SURVEYOR BY THE METROPOLITAN BOARD OF WORKS.

ON the 17th inst. the Metropolitan Board of Works met to appoint a surveyor under the Building Act for the district of Greenwich.

The following document was submitted to the Board:—

"*The respectful Memorial of SIDNEY GODWIN, Fellow of the Royal Institute of British Architects.*

Sir and Gentlemen,—Your memorialist ventures to approach you, and to say,—

That he has passed seventeen years in daily assisting to supervise buildings under the Metropolitan Building Acts, with the object in view of being appointed a district surveyor, and is fully competent to discharge the duties of that office.

That, at two separate periods, he has received the confidence of your Board, by being appointed to act as deputy district surveyor.*

That he has been before you as a candidate for a surveyorship under the Acts for seventeen districts without success, on account, as he has been informed on many occasions, of his having a brother a district surveyor,—the district surveyor of South Islington.

That, at the election for Hammersmith, in May, 1863, he was at the top of the list of first voting, when Mr. Knightley was eventually elected; and, at elections following, he, your memorialist, has been third or fourth on the voting lists, while, at the last election, his name was much lower on the list, on account, as he has reason to believe, of the opinion above mentioned.

Your memorialist therefore humbly prays that your Honourable Board will take into consideration the time he has devoted, with a view to obtaining an appointment as district surveyor, and will not allow this objection to weigh, and will grant him, on the next occasion, the object, for the attainment of which he has so long struggled at the cost of so many years of his life. If appointed, he will devote his best energies to perform the duties satisfactorily.

With a view still further to lessen the objection expressed, your memorialist is authorised to state that, should your Honourable Board grant his prayer, the present district surveyor of South Islington will, within twelve months from that event, place his resignation in your hands, to be dealt with as your Honourable Board may desire. SIDNEY GODWIN."

* Dates of appointment, July, 1863, and August, 1865.

Twenty-four candidates presented themselves, or were represented by medical certificate.

From these, six were selected by vote to go to the poll. On the first voting after the selection the candidates stood in the following order:—1. Mr. Tabberer; 2. Mr. S. Godwin; 3. Mr. Matthews; 4. Mr. Lansdown; 5. Mr. Piper; 6. Mr. Notley; and ultimately Mr. Tabberer was elected.

CHURCH-BUILDING NEWS.

Handsworth.—During the past twelve months the chancel of Handsworth parish church has been undergoing a restoration. Messrs. M. E. Hadfield & Son, architects, were requested to prepare a report and plans for accomplishing this object, which were adopted, and these gentlemen were instructed to proceed with the work. New roofs of stout oak coupled rafters have been placed on the chancel and chantry, covered with Staffordshire tiling, carved braces being introduced at intervals. In removing the old roof of the chancel several of the original rafters in a mutilated condition were found. The walls of the chancel have been partially rebuilt; single lancets of the old form have been inserted in the south wall, the eastern windows having been repaired. The ancient sedilia and piscina have likewise been brought to light and restored. The north wall has been repaired; but perhaps the most important feature in the alterations internally is the new chancel arch, of hewn stone, having bowtell columns with moulded capitals and bases, sustaining a narrow pointed arch of low and massive style of two orders, chamfered and moulded,—the whole details having been studied from the tower arch of the church. The floors of the chancel and chantry have been lowered 2 ft. and relaid with encaustic tiles, and the old monumental slabs on a bed of concrete. Stalls of oak for the choristers and communion rails of suitable design have replaced the high pews. A new organ to be placed in the Norfolk chantry, in an oak case, is being built by Mr. J. Stacye, of Sheffield. Externally the walls and stonework have been repaired and pointed, and the gable copings renewed and surmounted with floriated crosses. The earth has been lowered and the ground drained. In the north wall of the chantry two new windows have been inserted, with new buttresses and parapet, and the walls partially rebuilt. These, with the new roof, are designed in the Perpendicular style of architecture, to which this part of the church belongs. The works have been executed by Mr. W. J. Greenwood, of Handsworth, mason; Mr. J. Hayball, Sheffield, carpenter; Mr. J. B. Covill, plumber and glazier; and the tiling by Messrs. Harrison & Chadwick; the oak choir fittings by Mr. Marshall, of Handsworth. The whole has been carried out from the drawings of the architects and under the immediate supervision of Mr. Charles Hadfield. Although the chancel has thus been placed in a satisfactory condition, much remains to be done to the nave and aisle of the church westward, where a beginning has been made by the opening out of the original tower archway, which has been fitted up as a vestry. A new floor and ceiling of moulded oak beams have been inserted for the ringers, and a lectern in oak has been given by the Rev. J. B. Mitchell, late curate of Handsworth.

Catterick.—A vestry meeting has been held to receive a report on the state of the parish church from Mr. C. G. Wray, architect, and a committee formed to raise subscriptions for making the necessary repairs, as it appeared from the report that the roof is in such a dangerous state that the church has to be closed until it has undergone a thorough restoration.

Bradford.—A new church is to be built for St. John's parish on a new and more central site in Little Horton-lane. Resolutions to carry out the project have been adopted. About 1,000*l.* are already promised.

Doncaster.—The Archbishop of York has laid the foundation-stone of a new free church, or chapel of ease, to be built in the parish of Christ Church, for the use of the poorer population of the parish. The site of the new building is in Catherine-street, and the cost of the proposed edifice will be about 6,000*l.*, towards which sum between 2,000*l.* and 3,000*l.* have already been subscribed. The architect instructed to carry out the work is Mr. Thomas Penrice, of London. The contract for the building was given to Messrs. T. & C. Anelay, the contract price being 3,061*l.* 11*s.* 8*d.* The church will be built in the Gothic style of the thirteenth and fourteenth centuries. It will have a western entrance, with deeply-recessed doors, facing St. James's-street, above which there will be a five-light traceried window. The gable will be terminated by a bell-turret, surmounted by a cross. The side elevations will be divided into six bays with two-light windows in each, with tracery in the heads, between the buttresses. At the eaves there will be a cornice, supported by corbels. The roof will be high-pitched, of the angle of 57 degrees, and will be covered with Whitland Abbey slate on felt. The arch leading into the chancel will be built, but for the present will be filled in with brickwork. The organ-chamber, when built, will be situate in the last bay on the south side, nearest the chancel, and will communicate with the nave by an archway. The length of the building will be 86 ft. by 32 ft., and will be arranged to accommodate 500 hearers. The interior will be fitted up with moveable benches. The whole of the stone for the carving will be for the present left in block.

Pitchcombe.—The Bishop of Gloucester and Bristol has re-consecrated Pitchcombe Church, which has been restored by the parishioners. The work has been executed by Mr. Gyde, of Pitchcombe, from the designs and under the superintendence of Messrs. Medland & Son, of Gloucester and London, at a cost not exceeding 800*l.* The west window is the gift of Mr. Augustus Matthews, in memory of his late father, Mr. Peter Matthews. The subject is the Baptism of John the Baptist. It is placed at the west entrance of the church, and the artists are Messrs. Clayton & Bell.

Cambridge.—The chancel of the new church of St. Barnabas, Mill-road, Cambridge, has been opened. The entire building is designed to have nave and aisles, with a vestry, on one side, and an organ-chamber on the other. The style of architecture is Third Pointed. The chancel is 34 ft. long by 22 ft. wide inside, and in height is 48 ft. to the top of the roof. The walls are of brick, with white brick facings on the outside. The windows, string-courses, corbel courses, weatherings, &c., are of Corsham stone. The eastern window is designed for stained glass. Nearly 200 persons can be seated in the chancel. The whole church, when completed, will accommodate nearly 600 adults, exclusive of the chancel. The nave and aisles to be added to the chancel will be 80 ft. long by 55 ft. broad; and a bell-turret and porch will be erected at the western end. The cost of the portion erected is about 1,000*l.*, of which amount some deficiency exists. The funds to complete the building have to be raised by subscription. The architect is Mr. Talbot Bury, of London. The builders are Messrs. Quinsee & Attack, of Cambridge. The interior of the chancel is lighted with gas, and the seats are composed of rush-seat chairs (fixed).

Almeley.—The ancient Church of St. Mary, Almeley, has been opened for divine worship, after undergoing extensive restoration. The fabric was in a dilapidated condition, and the work was commenced some eighteen months ago, the architects being Messrs. Bodeley & Garner, of London; and the contractor for carrying out the work, Mr. T. Holland, of Eardisland, builder. The church is an old stone building, in the Decorated style, Second Period, and was partially restored about 1843, by cleaning the old stone pillars and bringing out the old oak ceiling; it has a nave, aisle, miniature transept, porch, chancel, organ, vestry, and tower, with five bells and a clock. The roofs of the aisles, vestry, and porch have been renewed in oak, those of the nave and chancel repaired, and the whole lathed and tiled afresh; all the coping and other necessary and ornamental stonework of the exterior having almost entirely disappeared; new work of the character of the old has been substituted; while the pavement, walls, and roofs, within the building, all testify in their changed condition that renovation was imperatively required. The renovations in the interior include the removal, first of all, of the plaster on the walls and the re-pointing of the same, and the lowering of the pavement of the church by about 6 in. The chancel roof has been raised by about 4 ft., so disclosing what had hitherto been totally hidden—the upper part of the arch forming the division between the chancel and

the nave. The roof has also been opened out, new quarters being put on, diagonally, at the back of the old oak principals. The old roof of the nave has also been cleaned down. A new four-light stained-glass window, by Messrs. Burlison & Grylls, of London, has been inserted in the east end of the chancel. The head of the window is filled in with angels and cherubim; in the centre openings are the Virgin and Child and St. Ann, and in the lower openings St. Gabriel and St. Mary, the right light being filled with St. Cuthbert and St. Boniface, and the left with St. Thomas and St. Augustine. The head of the window nearest the east end, in the south aisle, is filled in with the emblems of the Cross in stained glass; and the head of the east window, in the same aisle, with the Virgin and Child, on a ground of ruby diaper. In the head of the east window in the north aisle, is the Crucifixion, and the window next it (the first of those in the north aisle counting from the chancel) is filled in with the arms of several families of distinction. These windows are also the work of Messrs. Burlison & Grylls. A new rood-screen, carved in oak, the work chiefly of the builder himself, has been put up. New open benches of oak take the place of the pews of former days, the old material,—some of it carved,—being used in panelling. A portion of the old panelling is re[illegible]to form the roof of the aisles, new oak [illegible]ly being added. The altar is new, [illegible]rest of the work, is of sound heart [illegible]or the present the tower remains as it [illegible]cepting for some little pointing. The [illegible]re cost, including the stained glass, amounts to about 1,800*l.*,—towards which Mr. Gibson Watt, the chief landowner in the parish, contributes 500*l.*, and the Ecclesiastical Commissioners 400*l.* The total amount subscribed, up to the present time, is about 1,400*l.*

DISSENTING CHURCH BUILDING NEWS.

Dunmow.—A new Congregational Chapel has been opened here for divine service. The architect was Mr. Chas. Pertwee, of Chelmsford. The building occupies the site of the old chapel, and is of red brick and slated, partaking of a Romanesque character, the openings generally having semi-circular heads, relieved with white arches, strings, and stone dressings. The main entrance to the building is through triple arches in the centre gable, supported on columns with carved caps, leading into a vestibule or loggia paved with encaustic tiles. Entrances and staircases on each side of the building communicate with the galleries. Internally a gallery, with open iron-work in front, supported on iron columns, runs round three sides of the building, the end opposite the pulpit being semicircular, and in the rear of the pulpit, in a semicircular apse, obtained over the vestries, is provided an organ and singers' gallery. The roof is partly open-timbered and vaulted, divided into panels by arched principals and perforated ribs, through which ventilation is arranged. The ground-floor and galleries are fitted up throughout with open benches of stained and varnished deal. The aisles are paved with encaustic tiles and cement. The pulpit, which is of stained deal, is placed upon a raised semi-circular dais, upon which are arranged seats for the deacons. The lighting is by means of gas starlights suspended from the roof and brackets from the wall; and the heating, by a hot-air circulating apparatus fixed in the basement. The work has been carried out by Messrs. Cole Bros., of Thaxted, builders, under the direction of the architect, at a cost of 2,450*l.*, inclusive of the purchase of a portion of ground, erection of boundary walls, fences, and all incidental expenses. Accommodation is provided for 900 persons.

Gravesend.—The memorial stone of the English Presbyterian Church, in course of erection in the Grove, has been laid. The church will be capable of accommodating 650 persons, and has been erected by Messrs. Bull & Son, of Southampton, from designs by Mr. Alfred Besborough.

Sheffield.—The foundation-stone of a new chapel, in connexion with the United Methodist body, at Pye Bank, has been laid. Mr. T. Simpson, of Nottingham, is the architect. The chapel will be situated at the angle of Pye Bank and Haywood-street, some 200 yards from the place of worship at present occupied by the United Methodists. It will be in the Early English style, and will be built in two stories, the basement forming a school. The level of the school is elevated, and the chapel will be on a level with Pye Bank. The chapel is to be amphitheatrical, and will furnish accommodation for 1,200 persons. Ingress and egress can be had at either end from two angular towers. The school is also laid out in amphitheatrical form. It is surrounded by vestries or class-rooms, above which is a horse-shoe gallery, which will accommodate 1,000 children. This gallery will be appropriated to the use of the junior scholars, whilst the arena will be set apart for the seniors. At the end of the school will be a forum, from which the children can be addressed, and which will render the room easy of adaptation to the purposes of a public hall or a lecture-room. The school is 17 ft. in height, 68 ft. in length, and 56 ft. wide in the extreme dimensions, and on the ground floor or arena it is 54 ft. long and 35 ft. wide. The dimensions of the chapel are of similar extent. The basement story is to be built in rock-faced stone with white dressings, and the superstructure in brick with polychromatic dressings. The cost of the whole will be about 4,000*l.*, and the contracts have been placed in the hands of Mr. James White, builder.

Acton.—The memorial stone of a new Congregational Chapel at Acton has been laid by Mr. H. Wright, J.P., Kensington. The building, which will be of Gothic design when completed, will seat on the ground floor 500 people. The estimated cost is about 4,500*l.*, half of which has already been promised, and among the donors are Mr. Samuel Morley, M.P., for 500*l.*, and Mr. Charles Walton, for a similar amount.

Darlington.—The present sombre-looking building in Archer-street, used by the Baptist denomination as their place of worship, says the local *Times*, will shortly be superseded by a stone structure in the Grange-road, the foundation-stone of which has been laid by Mr. J. B. Pease. The building is to be Italian in style, and is to be composed of Forcett stone. The length of the entire building on the ground-floor is 56 ft. by 44 ft.; and on the gallery-floor, which extends over the entrance, 66 ft. by 44 ft. The porch at the entrance of the chapel has two staircases leading into the side galleries. At the rear of the building, on the north side, there are two class-rooms, 13 ft. by 11 ft. Adjoining these is a lecture-room, 27½ ft. by 15 ft.; and on the south side a minister's vestry, 15 ft. by 12½ ft. Over these buildings is the Sunday-school, which is 53 ft. long by 22 ft. The chapel will give accommodation to 600 persons, 350 on the ground floor and 250 on the gallery floor. This will exceed the provision given for congregations in the present chapel by above 350. A platform will be used instead of a pulpit, and behind this, in the centre, on the same level, will be an organ-chamber. The whole of the pews are to be without doors, and will be of stained pitch-pine. The gallery will be fronted with ornamental ironwork, to avoid the heavy appearance which would be caused if formed entirely of woodwork. The building was designed by Mr. W. Peachey, of Darlington, architect.

Langley Mill.—The memorial stone of a new Wesleyan Chapel at Langley Mill, Heanor, has been laid. Mr. Smith and Mr. John Gething Bowes (of Langley Mill), have undertaken to build this new chapel. There will be attached to the chapel a Sunday school, a vestry, and a retiring-room, the cost being set down at 800*l.* Mr. J. Barber, of Eastwood, is the architect.

Booth Town.—On Whit-Tuesday, says the *Halifax Guardian*, the, corner-stone of a new Wesleyan Methodist chapel, to be situate in a populous part of this locality, was laid. The building, of which Mr. S. Utley, of Halifax, is the architect, will be in the Italian style of architecture, and will accommodate 540 persons. Adjacent to the building will be a day school, and the estimated cost of the whole will be 2,500*l.*, towards which 1,000*l.* were contributed by the representatives of the late Mr. W. Heap; 100*l.* by Col. Akroyd, M.P.; 50*l.* by Sir F. Crossley, bart., M.P.; and 100*l.* by the Wesley Chapel Building Committee.

Newcastle-upon-Tyne.—The chief-stone of a Methodist Free Church has been laid at Byker, Newcastle. The edifice has been designed by Mr. S. Oswald, of Newcastle, architect, and will be of stone, in the Early English style, having five lancet windows in the north, or front, gable, and ten lancet windows in the east and west walls. The roof will be entirely exposed to view, and constructed with four arched principals of timber. The north front will have two entrance porches at the sides, and a vestry and school-room are to be annexed to the south end of the church. About 270 sittings will be provided, and the cost will be about 800*l.* Mr. T. Alexander, mason, of Newcastle, and Messrs. Greason & Stockdale, carpenters, of Gateshead, are the chief contractors. The church will be warmed and ventilated by apparatus devised and supplied by Messrs. Lewis & Co., of Middlesbrough.

Belper.—It has been resolved to build a new Independent Chapel at Belper, at a cost of 3,000*l.*, on the site of the old chapel. The plan of the chapel has been prepared by Mr. Woodhouse, of Bolton, and is to be in the Gothic style, with a tower and spire, and capable of accommodating 450 persons. The present chapel was built about a hundred years ago, and it has been thought better to take it down and build a new one, rather than repair it. The greater part of the money has been provided.

SCHOOL-BUILDING NEWS.

Bowling.—The foundation stone of some new schools in connexion with St. John's Church, Bowling, is to be laid on the 28th of this month, by Mrs. H. W. Ripley. They are to be erected immediately behind the old ones, on a site which has been purchased at a nominal price from the Bowling Iron Company. The plans have been prepared by Messrs. T. H. & F. Healey, architects. The schools will be erected in the Gothic style of architecture of a character suitable for school purposes. The plan consists of three school-rooms, in the shape of the letter H, for infants, boys, and girls, and there will also be class-rooms. The aspect of the building will be south, and the main front will look into a spacious playground. The infants' school will be 48 ft. in length by 19 ft. in breadth; the girls' school, 48 ft. 6 in. by 19 ft.; and the boys', 56 ft. by 19 ft. The entrances to the schools will be separate, and the yard accommodation for the infants and girls, and the boys, will be also separate and distinct. Internally, the rooms will be 18 ft. 6 in. in height to the ceiling. The main gables will be lighted with ornamental circular windows, and the remainder of the windows will have stone mullions and transoms. The schools inside will be boarded round to the height of 4 ft. with dressed and stained woodwork, and the infants' school and class-rooms will contain galleries for the children. The buildings are designed to accommodate 400 scholars, and the cost is estimated at about 2,000*l.* exclusive of the site.

Brightwell and Sotwell.—The school-room erected for the united parishes of Brightwell and Sotwell has been opened. The building is of red and grey bricks, the roof covered with red tiles; and the principal room is 43 ft. long by 23 ft. wide. The partition between the school-room and class-room is formed by folding-doors, which slide back, and thus form a large room, 60 ft. long. The passages on each side of the class-room are used as cloak-rooms, and lead to the out-offices, &c. At the back of the school-room there is a good roomy playground, fenced in. The building was erected by Mr. G. Wheeler, of Dorchester, Mr. Buckeridge being the architect.

Gloucester.—St. Luke's new schools have been opened. The architect of the building is Mr. Afred W. Maberley; the builder, Mr. S. J. Moreland, both of Gloucester. There are three schoolrooms placed side by side,—the boys' on the left, the girls' in the centre, and the infants' on the right. Each room is 20 ft. wide, and the three are respectively 70 ft., 60 ft., and 65 ft. in length. A large entrance-porch, serving also as a hat and cloak room, and a class-room, containing an average space of 250 superficial feet, are provided for each of the three rooms; and there are also lavatories attached. Internally, from floor to ridge, the height is 27 ft., and to the collar-beam of the roof 16 ft. They are lighted by large stone-mullioned windows at the sides and ends. Externally, the schools are constructed mainly of red bricks, relieved by bandings of stone and blue bricks at intervals. The central school gable has a circular window deeply recessed, the arch supported by carved columns, and the whole surmounted by a bell-turret, wherein is hung a bell. The two side schools have three-light windows at each end, with stone mullions, heads, and cells. In order to secure as much light as possible, the side windows have been carried up and finished with carved gables, and the ventilation is thereby increased by square-framed louvre ventilators, finished with spirelets and finials, and fixed in the centre of each roof. The master's house consists of a living-room, kitchen, scullery,

pantry, larder, coal-store, and so forth, on the ground floor, and of three bedrooms in the upper story. The buildings are inclosed in front with brick piers finished by stone caps and iron railing and gates; the other fencing is of wood and brick. The yards have been fitted up with Moule's earth-closets.

STAINED GLASS.

Doncaster Parish Church.—The Standish window, already described, has now been put up by Messrs. O'Connor in the north transept of this church. The committee for the Scholfield window for the south transept, which we have also described, have informed Messrs. Clayton & Bell that the work has given great satisfaction.

St. Mary's, Crumpsall.—The east window of this church has just been filled with painted glass. The architecture of the church is an adaptation of the Early Decorated period. The window, which consists of five lights, with upper tracery, is, with one exception, the largest east window in the neighbourhood of Manchester. The style of the painted glass has been designed to accord with the architecture. The subject represented is the second portion of the Apostles' Creed, the articles relating to our Lord. The lower range of subjects represents the Incarnation, the upper range the Passion, and in the tracery is the Ascended Majesty. The three centre lights are grouped together. The lower ones represent the Nativity of the Saviour, with the Adoration of the Shepherds and of the wise men from the East. The upper ones represent the Crucifixion, with St. Mary and St. John at the foot of the Cross. Flanking these subjects in the side-lights are,—below, the Annunciation and finding in the Temple; above, the Agony in the Garden and the "*noli me tangere.*" In the tracery above is represented the Saviour in Majesty, with the Virgin Mary and St. John Baptist below. In the surrounding compartments are busts of the two apostles, St. Peter and St. Paul, and of the archangels St. Michael and St. Gabriel. The cost of the window, which is several hundred guineas, is an anonymous gift. The work has been executed by Messrs. Lavers, Baraud, & Westlake, of London and Manchester. This is the second window which has been filled with painted glass in this church. The former one, to the memory of the Rev. J. W. Wyld, first rector of the parish, is a two-light window in the south side, and represents the Good Shepherd, and "Behold, I stand at the door and knock." This was also executed by Messrs. Lavers, Barraud, & Westlake.

Windermere Church.—The stained-glass window, purchased from the prior of Furness Abbey, at the dissolution of the monasteries, and removed to the parish church, Windermere, 335 years ago, has been removed to London. It is to be restored, from the drawings of similar windows in the Bodleian Library, provided funds can be raised for the purpose.

Coniscliffe Church.—The east window of this church has just been fitted with stained glass. The style of the window is Early English, and it is divided into three compartments. In the central one is a large picture of the Crucifixion, with St. Mary and St. John standing at either side of the cross; in a space beneath is the "Last Supper;" the subjects in the side-openings are the "Agony in the Garden," "Betrayal," "Scourging," "Entombment," "Resurrection," and "Ascension." The groundwork is grisaille, on the best antique glass, and a border surrounds each opening. The window is the work of Mr. Baguley, of Newcastle-on-Tyne. A painted reredos has also been placed against the east wall by the same artist. The church has been much improved of late by the erection of a porch on the north side, and is shortly to have coronas for lighting, by Skidmore. The whole cost will be defrayed by subscriptions, raised through the exertions of the vicar and Mrs. Lynn.

St. Chad's, Saddleworth.—A new stained-glass window of three compartments has just been inserted in the church of St. Chad, Saddleworth. It is the gift of Miss Sarah Radcliffe, of Boarshurst, in the said district, to the memory of her uncle, Mr. J. Nelson, late of Oldham and Bowdon. Subjects illustrated:—Christ and the Woman at the Well of Samaria, the Widow's Mite, and the Meeting of Christ with Mary in the Garden, after the Resurrection. This makes the sixth three-light stained-glass window with Scripture illustrations and subjects placed in the above church, and executed by Messrs. Geo. and J. R. Shaw, architects and glass-painters, Uppermill, near Manchester. The large east window of five lights, containing about 400 ft. of glass, has also been filled in by the same firm, the Last Supper occupying the five compartments below the transom, and the Crucifixion the portion above the transom, the tracery being filled in with a varied collection of figures and ornamental work.

FROM VICTORIA.

Melbourne.—The corner stone of a college, which is to be affiliated with the Melbourne University under the title of Trinity College, was laid on the 10th of February by the Bishop of Melbourne. The building stands near the south-west corner of the reserve, to the north of the University, and considerable progress in the erection of it has already been made by the builder. Only a small portion of the whole design, namely, the provost's lodge, &c., has been undertaken, and it is to cost 7,500*l.* The funds in hand amount to 4,000*l.*, and the buildings will be carried out as far as the money will allow.

Strathfieldsaye.—The Strathfieldsaye Shire-hall has been erected by the Strathfieldsaye shire council at a cost of 700*l.*, from the design of Mr. George Steane, the shire surveyor; Mr. George Pallett, of Sandhurst, being the contractor. The hall, with the offices and corridor, is erected of red brick with white dressings. The walls are built hollow, open at top and bottom, ensuring a draught to cool them in the summer time. The hall, 30 ft. long, 21 ft. wide, and 16 ft. high, is enriched with a cornice, centre flowers, and numerous ornamental ventilators. The roof, heated by the sun's rays, will create a draught, withdrawing the vitiated heated air from the hall to be replaced by fresh air supplied through ventilators at a height of 6 ft. or 7 ft. from the ground. The area of the shire is about 220 square miles, and the population about 4,000 persons. The shire of Strathfieldsaye is essentially a farming district, and has produced some of the finest cereals in the colony, and it is also the vineyard of Bendigo. There are not at present many manufactories; the only one of any considerable importance being an extensive tannery, making great quantities of leather for the colonial and English markets.

Echuca.—The Town-hall and Court-house, Echuca, is of red brick, with white brick facings, and is covered with a slate roof. The whole when complete will cover a space of 71 ft. by 76 ft. The rooms now built are six in number, the principal being the court-house, which is 35 ft. by 20 ft., and the municipal chamber, 47 ft. by 24 ft. The others are intended for the offices of surveyor and clerk of the courts, on the Crown side of the building, and for the offices of the town clerk and surveyor on the municipal side. The original plans provided for plaster ceiling; but, on further consideration, the borough council deeming that the great heat of the district required wood rather than plaster, the ceiling of their part of the building is accordingly in panel, from designs by Mr. Pascoe, their town clerk and surveyor, and picked out in colours red, white, and blue, with two glass chandeliers suspended from the centre. The total cost of the building, as it now stands, is about 2,300*l.*, of which Government gives 850*l.* The architects were Messrs. Vahlam & Getzchman; the contractor, Mr. James Mackintosh, of Echuca; and the works have been carried out under the superintendence of Mr. Pascoe, the town surveyor.

Books Received.

Eighty-two Illustrations on Steel, Stone, and Wood. By GEORGE CRUIKSHANK. With letter-press description. London: W. Tegg.

IN a smart quarto volume, Mr. Tegg has here brought together selections from the illustrations of various books produced, in times gone by, by the veteran artist and sound earnest man, George Cruikshank, — the Life of Napoleon, Life of Nelson, Beauties of Washington Irving, Serjeant Bell, Baron Munchausen, Knickerbocker's History of New York, Peter Parley, Hone's Every-day Book, and others, with "Gin" and "Water," for title pages. Some of them were made so long ago that they will be quite new to the present generation of readers. They contrast strikingly with illustrations of the present day, in being compositions, real pictures, having half a dozen or a dozen figures in them, with expression in the wee faces, the surrounding background carefully filled in, and illustrating unmistakably, small as they are, the passage to which they are appended, instead of the everlasting two figures, inane and namby-pamby, which now form the staple of too many illustrated works. The volume is equally interesting and amusing.

VARIORUM.

"THE Holiday Number of London Society" deals as usual with excursion-trains, sea-side rambles, and Continental experiences, and has a full allowance of pictures.—— The *Illustrated News* of last week contains a large and remarkable view of stately Oxford.—— "Tabulated Weights of Angle, T, Bulb, Beam, Round, Square, and Flat Iron, for the Use of Naval Architects and Shipbuilders. By Chas. H. Jordan. London: Spon." The author of these tables states that he carefully calculated and compiled them for his own use, as he much felt the want of such tables.—— "The Timber Merchant's Pocket Companion. By C. Gane. Gane & Co., Wisbeach." This is a small card, with three tables, useful in the measurement of w[illegible]. [illegible]ter and Church, [illegible]hicners. [illegible]yde, of the

Miscellanea.

Tin-lined Lead Pipes.—The patent of Mr. Haines, of Liverpool, is thus described in the local *Daily Post*:—Mr. Haines's patent may be simply described as a lead-encased block tin pipe, which it is found resists all corrosive influences. It is now being manufactured in considerable quantities. We had an opportunity of visiting the factory and of witnessing the process of manufacture, which, however, with one single and most important exception, is the same as that adopted in the production of the ordinary lead piping. The exception is in the casting of the ingot. The molten lead is first poured into a mould, in which, by the insertion of an iron bar, a space is left for the tin. When the lead has cooled the bar is removed, and a mandril of the exact width which the pipe is to take is inserted. Around this again the molten tin is poured, and when the mass has cooled it goes through the usual process until it emerges in the form of a pipe. . . . . The engineer to the Glasgow Corporation works has tested the piping with reference to its cohesive power, and has reported that it has on an average of three tested thicknesses a cohesive strength double that of the ordinary lead pipe. The result of the experiments at the Liverpool waterworks on the 5th of May last were even more encouraging. Three thicknesses of the ordinary lead piping tested had an average cohesive strength of 2,840 lb., while the lead-encased tin pipe showed an average cohesive strength of 6,481 lb.

A Civic Sanitary Staff.—The authorities of Glasgow, says the *Daily Express*, have at length the satisfaction of having organised the most complete "sanitary department" probably ever established as a permanent branch of administration in any of our British cities. The object aimed at is no less than to prevent disease,—not only to wipe away the reproach which Glasgow has of late years been incurring from the mortality returns, but to render the town more clean and sweet to live in, to improve the habits and condition of the poor, and to secure more vigorous health and greater length of days to all. The "Sanitary Inspection Service" consists of a chief officer, five district inspectors, and thirty ordinary nuisance inspectors, each of whom has a section of one of the five districts into which the city has been divided under his charge.

Dundee: Strike among Masons.—There are some disputes at present between the operative masons employed in the quarries and the quarry masters. The men contend that all apprentices, especially in quarries, should be indentured; that they should be paid by the day instead of by the piece; and that no stones should be dressed in the quarries. At a meeting on Friday week, the first two points were conceded by the quarry masters, but the third point remains unsettled. We understand that some of the master builders support the men regarding the third point. About 100 men are out on strike till the remaining difference is settled.

Leicester-square.—In reply to Captain Dawson-Damer, Mr. Ayrton said that he had not been able to ascertain whether any person claiming to be the owner of Leicester-square proposed to let it on a building lease. If such were the case, he could only interfere by means of a private Bill, which, according to the Standing Orders, he would be precluded from introducing during the present session. Besides, it would be a dangerous thing if, when a local authority neglected its duty, the First Commissioner of Works were to come forward to undertake it, as the result would be to throw on the Treasury an expense which ought to be paid out of the local funds. If the statement in question were correct, it was only a practical illustration of the necessity for a reform of the local government of the metropolis. He had endeavoured to press this subject on the attention of the House by more than one report from the Select Committee over which he presided, and he hoped his right hon. friend the Secretary of State for the Home Department would be able next session to deal with this very important question.

The Opening of the New Independent College, at Taunton.—The Independent College, at Taunton, of which we gave a view and plan in our volume for 1869, pp. 186, 187, has now been formally opened. The building is situate in a wooded estate of 25 acres, called Fairwater. It is about half a mile from the railway station at Taunton, and is visible to passengers on the Bristol and Exeter railway. The present arrangements provide for the reception of 150 boarders, but admit of extension for the accommodation of 200. The style is Tudor-Gothic, and the building is of West Leigh stone, with Bath stone facings. In the grounds are covered play-ground, gymnasium, tennis-court and bathing-place. The Fairwater mansion adjoining supplies a residence for the principal, besides a considerable space available for other purposes. The cost of the land was 5,760*l.* 4*s.*7*d.*; the contract for building, 10,500*l.*; and the drainage, ventilation, architect's fees, clerk of works, &c., bring the total cost to nearly 20,000*l.* The architect was Mr. Joseph James, London; and the builder, Mr. Henry Davis, Taunton.

The Oxford Architectural and Historical Society.—The excursion to Warwick took place on Saturday before last, when between thirty and forty members and their friends visited the castle, the church, and other buildings. By permission of the Earl of Warwick the society enjoyed unusual facilities for viewing the castle; as in addition to the usual portions shown to visitors, the society was permitted to inspect the various vaulted chambers in the basement. The general opinion of the members was that there were none of the existing buildings of earlier date than the reign of Edward III. In his reign there were two Earls of Warwick, named Thomas, father and son, and by them the greater part of the existing castle was erected. This included the great hall and the range of rooms westward, Cæsar's tower, the Barbican, the basement of Guy's tower, and the eastern side of the fortified enclosure. The upper part of Guy's tower was erected in the fifteenth century, and there are also Elizabethan and modern additions.

The Gallery of Illustration.—The plot of Mr. and Mrs. German Reed's new entertainment, "Our Island Home," told in straightforward language, would seem the most terrible and audacious nonsense that a brave author had ever ventured to commit to an intellectual British public. Still it is very droll, looked at from the right point of view, and Mr. Reed has composed for it some very bright and sparkling music, so that being acted with wonderful *verve* and unflagging spirit by Mr. and Mrs. Reed, Miss Fanny Holland, Mr. Arthur Cecil, and Mr. Corney Grain, it will doubtless run a considerable time, and make a large number of people laugh. An effective scene by the sea has been produced for it by Mr. O'Connor, and the dresses are charmingly fanciful. "The School Feast," by Mr. Corney Grain, of which we have already spoken with warm commendation, concludes the entertainment. Mr. Grain is an actor as well as a musician, and will make his mark.

Engineers for India.—It is reported, says *Nature*, that the Secretary of State for India has determined upon establishing in this country a complete College of Science for civil engineers, for the education of those who are to be employed on the extensive Government works in India.

Public-Houses without the Drink.—The sixth "public-house without the drink" was opened on Tuesday, May 31st, at Chapeltown, Leeds. The well-known motto, "Come and Welcome," appears conspicuously to all passers-by (whether on the top of the omnibus or on foot), as do also the large characters of "British Workman, No. 6," while the old sign of the "Swan" has been erased to make way for the words familiar in other parts of the town:—

"A public-house without the drink,
Where men may sit, talk, read, and think,
Then safely home return."

The tap-room and inner parlour are supplied with daily papers and monthly periodicals, while the large club-room upstairs is admirably adapted for meetings of various kinds which may be held in connexion with the place. Clubs and sick societies can here be accommodated without the necessity of "drinking for the good of the house." The opening was celebrated by a tea, bountifully provided by the ladies of Chapeltown, in the Wesleyan schoolroom: so there was drink after all.

Building Land, Brighton.—Some plots of land sold lately, by order of the Town Council, realised the sums affixed:—Lot. 1. Freehold plot of building land, numbered 78 in North-road, adjoining on the east the site on which the Dolphin Inn is to be rebuilt, presenting a frontage to North-road of 18 ft. 6 in., with a width at the north end of 18 ft. 10½ in., a depth from north to south on the east side of 40 ft. 2 in., and on the west side of 39 ft., 280*l.* Lot 2. Plot of freehold building land, abutting on the south to No. 5, Marlborough-place, possessing a frontage to Marlborough-place of 22 ft., a like width at the west end, a depth from east to west on the north side of 56 ft. 1 in., and on the south side of 56 ft. 7 in., 400*l.* Lot 4. Corner plot of freehold building land, 23 ft. to Marlborough-place and 57 ft. 8 in. to Church-street, having a width at the west end of 25 ft., and a depth from east to west on the north side of 57 ft. 1 in, 560*l.*

Sales of Property in Bromsgrove and Bromyard.—Mr. Cotton offered, at the Dog and Pheasant Inn, Bromsgrove, 47 a. 2 r. 6 p. of land at the Lickey, and after a spirited competition it was purchased by Mr. Walter James, for Mr. James Woodman, Redditch, for 1,560*l.* A cottage and 2,760 yards of land near the above was sold to Mr. J. Lea, for 157*l.* Mr. Nathaniel Taylor, auctioneer, has sold by auction several freehold properties in and near Bromyard, belonging to the late Mr. Humphrey Bowen, deceased. A freehold property, consisting of three cottages, outbuildings, and 5 a. 2 r. 2 p. of land, situate at Edvin Ralph and Edvin Loach, sold for 540*l.* A freehold house and premises, situate in High-street, let at 13*l.*, sold for 240*l.*; and a similar house, adjoining, let at same rental, was knocked down for 245*l.* There was a good attendance, and the biddings were given with considerable spirit.

Egyptian Antiquities.—At the Syro-Egyptian Society (Hart-street, Bloomsbury), last week, Mr. Bonomi described the collection of antiquities found in Egypt by the late Mr. Robert Hay, of Linplum, and now in the rooms of the Society. The collection is very large and various,—1,084 items are mentioned in the catalogue,—and is now for sale. One of the most noticeable objects is a statuette of the Ptah of Thebes, 26½ in. high, an extraordinary work in metal. The core is bronze, which has been covered with a white stucco to represent the white mysterious dress of this god. The face and hands, as well as the necklace, have been gilt; the eyelids and eyebrows, the scalp, and a square projection in front, are in a composition of antimony, which is of a considerable thickness, overlaying the bronze core at this part. The eyes have been inserted.

Water in Edinburgh.—Mr. Gale, C.E., has issued a report on the water supply of the city of Edinburgh. His general conclusions are that Edinburgh is at present using nearly 9 million gallons of water a-day; that the quantity must be reduced to 7 million gallons a-day till the reservoirs get filled up; that not more than 7½ million gallons a-day can be got from the works in a moderately dry year; that the reduced quantity should be regularly spread over the summer; and that the only proper way to accomplish this is to institute a system of intermittent supply. This reads very much like going backwards.

Metropolitan Tramways.—A committee of the House of Commons has sanctioned another extension of the Metropolitan tramway system. The projected line will start from a point near the Bank, and will pass through Moorgate-street, the City-road, Islington, and the Holloway-road, to the Highgate-archway, with intersecting branches from the leading thoroughfares of the district. The Committee have declined to sanction the crossing of Westminster Bridge by tramways.

A Forgotten Bell.—I am putting on a spire to the Archdeacon's Church, near Alnwick, at the cost of a county squire, as a memorial of his son, Captain Carr, who was killed in New Zealand, and I found an old bell in the belfry, the existence of which has been lost sight of for generations. It bears an inscription in German. It strikes me the inscription is unusual.

"Antonis es minen name. Ic ben gemacet nit pacr: : m : : cccc : : lxxxix. +

"Antonis is my name: I was made in the year 1489."—F. R. W.

Ecclesiastical Dilapidations Bill.—In the House of Lords, the Archbishop of York moved the second reading of this Bill, which, he explained, was based on a report of a joint committee of the Convocations of Canterbury and York. At present there was no satisfactory mode of enforcing repairs, and it proposed that a surveyor of high position should be appointed in each diocese, who, wherever ordered, and on any presentation to a benefice, would make a survey. The Bill was read a second time.

Startling.—The church people of Hanley were on Saturday astonished by the announcement that "in consequence of necessary repairs," there would be no service in the Old Church on the following day. On inquiry as to the reason, it was ascertained that some slight cracking of the ceiling had induced a professional inspection. The architect called in has pronounced that the rafters are in such a dangerous state that it is next to miraculous that the entire roof has not fallen in long ago.

Fall of a Building.—The other morning the premises of the Royal Insurance Office, Park-row, Leeds, beside which excavations for a new building were being made, suddenly collapsed and became a heap of ruins. Fortunately the clerks were warned a few seconds before the accident, and they rushed out and escaped: thus no lives were lost and no injuries sustained.

New Public Hall for New Mills (Stockport).—The public interest of this township for a new and commodious public hall, for the purposes of a mechanics' institution, reading-room, &c., and a large room for the intended transaction of the magistrates' business, concerts, &c., has led to the laying of the foundation stone of the intended structure. The streets were gaily decked with flags, and there was a procession with other ceremonial.

Competition, Hull.—The plans submitted by Mr. Samuel Musgrave, Hull, have been selected in a recent competition for a Primitive Methodist Chapel proposed to be built in Lincoln-street, Hull; and he has been instructed to prepare working drawings for the erection of the buildings forthwith. There were seventeen other designs submitted.

International Exhibition of 1871.—The commissioners have resolved to set aside one guinea out of every season ticket sold at three guineas, through the Society of Arts, to purchase works of art and industry out of the Exhibition, for circulation throughout the United Kingdom. This determination will be open to misconstruction, we fear, by-and-by.

New Temperance Hall at Hanley.—The foundation-stone of a temperance hall has been laid in New-street, Hanley. The building is to be 20 yards by 12 yards, and to contain one large room, with gallery at one end, and committee-room under the gallery. The work is to be done under the direction of Mr. Lockett, and the estimated cost of the new building is 800*l.*

Ladies' Sanitary Association.—A bazaar and fancy sale, in aid of the funds of the Ladies' Sanitary Association, will be held (by permission of Madame Ernest de Bunsen), at Abbey Lodge, Hanover Gate, Regent's Park, on Tuesday and Wednesday, the 28th and 29th inst. A number of distinguished ladies will take part.

The Exhibition in Rome of Objects of Art appropriated to Religion.—In the distribution of prizes, France has taken a large proportion; namely, 26 prizes, and 37 prizes of encouragement. The commissioners and jurors have received decorations.

New Dulwich College.—This new college was opened on the 21st inst. by the Prince and Princess of Wales. Illustrations and descriptive particulars of the buildings will be found in the *Builder*.

St. Mark's Church, Leicester.—In addition to our notice (p. 451, *ante*), we may say that Mr. Nichols is the clerk of works.

Worthing Surveyorship.—Mr. James Lund, of Sheerness, has obtained this appointment.

TENDERS.

For the erection of thirteen cottages, St. Philip's Marsh, for Mr. E. Burgess. Mr. W. Cloutman, architect:—

C. Tucker	£1,690 0 0
Pope	1,560 0 0
Hobbs	1,250 0 0
Bailey	1,230 0 0
Stephens	1,172 0 0
Thomas	1,157 0 0
Griffiths	1,150 0 0
Gregory	1,118 0 0
Marsh	1,070 0 0
J. Tucker	975 15 0
Cork (accepted)	960 0 0
Martin	845 0 0

For new farm buildings at Dean Farm, Fareham, Hants, on the Roche Court estate. Messrs. Ford & Nance, architects. Quantities supplied by the architects:—

Light	£2,343 0 0
Quick	2,113 0 0
Burbidge	1,998 0 0
Bramble Bros.	1,887 0 0
Lawrence	1,846 0 0
Fulford (accepted)	1,793 0 0

For additions to Myddleton House, Waltham Cross, for Mr. H. C. B. Bowles. Messrs. Woodzell & Collcutt, architects:—

Rivett	£570 0 0
Chessum	535 0 0
Cooke & Green	497 0 0
Patman (accepted)	457 0 0

For house and stable to be erected at Hammersmith, for Dr. Spurgin. Messrs. Woodzell & Collcutt, architects:—

Chamberlain	£1,481 0 0
Adams	1,425 0 0
Dowell	1,370 0 0
Cook & Green	1,331 0 0
Goodman	1,213 0 0
Chessum (accepted)	1,140 0 0

For the erection of fever wards and other buildings, Romsey Union. Mr. Alfred Bedborough, architect. Quantities supplied by Mr. F. Warburton Stent:—

		Deduct if Brick is used instead of Stone to Portion of Dressings.
Bryan	£1,482 0 0	£20 0 0
Streeter	1,306 0 0	42 0 0
Grace	1,263 0 0	25 0 0
Smith	1,201 0 0	35 0 0
Macklin	1,210 0 0	36 0 0
Rose & Co.	1,195 0 0	—
Bailey & Son	1,193 0 0	60 0 0
Wheeler	1,179 0 0	22 0 0
Grace	1,137 0 0	69 0 0
Sanders	1,122 0 0	20 0 0
Taylor & Jessop	1,114 0 0	10 0 0
Stevens	1,098 0 0	28 0 0
Martin & Son	1,097 0 0	89 0 0
Till (accepted)	1,086 0 0	15 0 0
Brinton & Bone	1,080 0 0	16 0 0
Fielder	1,056 0 0	34 0 0
Philips	1,047 0 0	18 0 0

For main sewerage works, Birkdale, Lancashire. Messrs. Reade & Goodison, engineers. Quantities supplied:—

Hughes & Wardley	£14,833 11 8
Gilbert & Sharp	14,349 0 0
Naylor Bros.	14,245 0 0
W. & J. Worthington	14,130 0 0
Pilling	13,500 0 0
Taylor	13,050 0 0
King & Haring	12,925 9 2
Moore	12,709 0 0
Hardacre	11,889 0 0
Thane	11,603 12 4
Hartley & Parkinson	11,565 14 1
Stead	11,256 0 0
Winnard, jun.	11,177 0 0
Dawson	11,068 0 0
Standing & Littler	11,050 8 11
Fawkes & Maud	10,951 3 0
Carlisle	10,673 15 3
Keeble	10,663 0 0
Lee	10,655 0 0
Jones & Lipson	10,130 0 0
Young & Co.	10,109 0 0
Bloomfield (accepted)	9,769 14 4
Ford	8,818 0 0
Dudley	8,555 7 0
Mitchell	8,448 11 6

For roads and sewers on the Birkdale Park estate, near Southport, for Mr. Thos. Weld Blundell. Messrs. Reade & Goodison, engineers. Quantities supplied:—

Halliwell & Cowborn	£3,802 3 7
Abram & Richards	4,550 9 0
Taylor	3,470 0 0
Standing & Littler	3,236 0 0
Mitchell	3,023 9 7
Thomas	2,762 16 3
Blundell	2,321 9 9

For new schools, parish of St. Bartholomew, Islington, for the Rev. L. Stanham, M.A. Mr. Edwin Clare, architect. Quantities supplied by Messrs. Waymouth & Son:—

Preedy & Son	£1,950 0 0
Foster	1,997 0 0
Fairhall & Weeks	1,896 0 0
Williams & Son	1,890 0 0
Dove Bros.	1,885 0 0
Conder	1,862 0 0
Bishop	1,815 5 0
Hill & Sons	1,799 0 0

For Southport Baths and Assembly-rooms Company (Limited). Messrs. Horton & Bridford, architects; Mr. Charles H. Beloe, engineer:—

	1st Contract.	2nd Contract.
Hayes	£13,500 0 0	£2,700 0 0
Dover	13,919 0 0	999 0 0
Parker & Son	12,342 0 0	2,335 0 0
Robinson	11,900 0 0	1,900 0 0
Haigh	11,597 0 0	1,987 0 0
Swindells & Little (acceptd.)	11,400 0 0	1,692 0 0
Wade	11,019 0 0	1,978 0 0
Bridge	11,095 0 0	1,800 0 0

For building St. Mark's Church, Newport, Monmouthshire. Mr. John Norton, architect:—

	Church, including Tower.	Add for Stone Spire.
Roderick	£5,344 0 0	£960 0 0
Williams & Sons	5,580 0 0	400 0 0
Moreland	5,320 0 0	480 0 0
Clarke	5,127 0 0	447 0 0
Wall & Hook	5,100 0 0	350 0 0
Miles & Son	4,870 0 0	600 0 0
Diment	4,818 0 0	600 0 0
Jenkins & Thomas	4,748 0 0	585 0 0
Bolt & Co. (for the whole)	£5,563.	

For a new shop and alterations to house in the Wandsworth-road, for Mr. Hall. Mr. Murphy, architect. Quantities supplied:—

Colls & Son	£634 0 0
Tarrant	631 0 0
Sharpington & Cole	597 0 0
Haynes	595 0 0
Shapley & Webster	594 0 0
Cullum	577 0 0

For the erection of a house at Wimbledon, for Mr. John Turner. Mr. John Hudson, architect:—

Gibson Bros.	£7,820 0 0
Little	7,678 0 0
Adamson & Sons	7,492 0 0

For butcher's shop and office, for Mr. A. Wright, Wycombe. Mr. F. W. Burnham, architect:—

Hunt (accepted)	£390 0 0

For rebuilding house, Frogmore-gardens, Wycombe, for Mr. T. Wheeler, banker. Mr. F. W. Burnham, architect:—

Nash	£345 0 0
Pierce	260 0 0
Loosely (accepted)	220 15 0

For the erection of a workhouse, South Grove, Mile-end, for the Whitechapel Board of Guardians. Mr. Wm. Dobson, architect:—

Rivett	£26,789 0 0
F. & F. G. Wood	26,200 0 0
Wicks, Bangs, & Co.	26,019 0 0
Mann	25,779 0 0
Hearle	25,350 0 0
Sheffield	24,739 0 0
Capps & Ritso	24,595 0 0
Anscombe	24,300 0 0
Eaton & Chapman	23,889 0 0
Crabb & Vaughan	23,600 0 0
Hill & Keddell	23,170 0 0
Eunor	23,050 0 0
King & Sons	22,860 0 0
Kilby	22,788 0 0
Henshaw	22,384 0 0
Markwick & Thurgood	21,606 0 0

For building the "Ludgate Tavern," Ludgate-circus. Mr. Lewis H. Isaacs, architect. Quantities supplied by Mr. L. C. Riddett:—

Macey	£4,319 0 0
Holland & Hannen	4,239 0 0
Patman & Fotheringham	4,195 0 0
Mansfield, Price, & Co	4,116 0 0
Axford	4,095 0 0
Browne & Robinson	3,995 0 0
King & Sons	3,925 0 0
Phillips (accepted)	3,749 0 0

For the erection of schools, &c., in the Banyard-road, Bermondsey, for the trustees of the Drummond-road Chapel. Messrs. Wm. Berriman & Son, architects. Quantities supplied:—

Wells	£1,850 0 0
Perkins	1,792 7 0
M'Lachlan	1,649 0 0
Coleman	1,648 0 0
Tarrant	1,590 0 0
Thompson	1,580 0 0
Cullum (late Cooper & Cullum)	1,560 0 0
Rider & Son	1,460 0 0
Macers	1,320 0 0
Colls & Son	1,320 0 0
Fisher & Sons	1,308 0 0
Gibbs & Son	1,280 0 0

For alterations and additions to Roseland Villa, Woolston. Mr. A. Bedborough, architect. Quantities by Messrs. Curtis & Son:—

Gambling	£515 0 0
Chapman	484 0 0
Stevens (accepted)	467 0 0

For the erection of a Fire Brigade station and clock-tower at Richmond, Surrey, for the vestrymen of Richmond. Messrs. Brewer & Son, architects. Quantities supplied:—

Burt	£983 10 0
Seal	955 0 0
Wigmore	895 0 0
Sweet & Son (accepted)	847 0 0

For a new wing, City of London Hospital for Diseases of the Chest, Victoria Park. Messrs. Beck & Lee, architects. Quantities by Messrs. Welch & Atkinson:—

Ashby & Horner	£10,285 0 0
Ashby & Sons	9,990 0 0
Mansfield & Price	9,947 0 0
Conder	9,780 0 0
Myers & Sons	9,687 0 0
Higgs	9,533 0 0
Perry & Co.	9,495 0 0
Axford & Whillier	9,431 0 0
Jackson & Shaw	9,343 0 0
Chappell	8,647 0 0

For new wharf for the Patent Plumbago Crucible Company (Morgan's Patent), Battersea. Contract No. 1, wharf walls and basement story. M. R. M. Ordish, engineer. Quantities supplied by Mr. W. B. Backshell:—

Ebbs & Sons	£2,570 0 0
Manley & Rogers	2,365 0 0
Markwick & Thurgood	2,356 0 0
Baguley	2,300 0 0
Bayes & Ramage	2,150 0 0
Dickinson & Oliver	2,100 0 0
Sharpington & Cole	1,877 0 0
Jackson & Shaw (accepted)	1,620 0 0

TO CORRESPONDENTS.

SIR: Can an architect charge for journeys in carrying out works if the building is situate 4½ miles from his residence?—F. S. L. (Such a charge, beyond the ordinary per-centage, would be quite unusual.)

F. & N.—W. C.—J. R.—M. U.—E. M B.—C. D.—C. S.—T. W. C.—L. J. W. K.—V.—A. D.—E. & G.—W. S.—J. H.—W. V.—J. B.—W. & C.—E. C.—L. S.—J. L.—W. B. & Son.—L. H I.—H. H. S.—B. & L.—J. F.—R. G. S.—B. & Son.—J. H.—F. W. R.—C. A. G.—C. C. H.—J. C. T.—S. & W.—S. M.—K. & Sons.—W. C. A. ("hogging" is gravel from which the larger stones have been screened).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

ADVERTISEMENTS.

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The Builder.

VOL. XXVIII.—No. 1430.

The Strength of Beams and Columns of Wood, Iron, and Steel.

IT would seem that the "architects" of the present day have left the study of the scientific branches connected with construction entirely to the "engineers;" at least, we may infer that such is the case from the fact that the books which appear in such numbers on the strength of materials and other cognate subjects, are produced by members of the *engineering* profession, to the almost complete exclusion of those of the *architectural*. Time was when the "architect" was a man of science; that is to say, he was well versed in all the problems connected with laws of force as far as they were then understood; but in the present day, when science has advanced with such rapid strides, the architect is quite left behind, and appears satisfied with a mere smattering of mechanical or any other mathematical science. This state of things will go on until the more advanced members of the architectural profession see the necessity of compelling their pupils to go through a severe course of mathematical study before they are allowed to practise; otherwise they must not expect that their profession will be regarded as a scientific one by those who are competent to judge of such matters.

But, although architects will rarely take up scientific pursuits themselves, they are very glad to avail themselves of the investigations of those who do so; and, consequently, there is a demand for books in which they can find rules for the strength and proper proportions of beams, columns, &c., ready to their hand, without the trouble of examining and testing for themselves the *formulæ* or processes of reasoning by which they are obtained. The book* which Mr. Baker has produced, and of which we now propose to give an abstract (as far as it relates to subjects interesting to the architect) is one that will be of immense service to the student of building construction, as the methods of calculation are very fully explained, and can be worked out with but little use of algebraical *formulæ*; the author having "endeavoured to assimilate the process of investigation to the ordinary routine of the drawing office; in other words, he has preferred compasses to equations, and scales to logarithms, whenever the selection was optional."

The student, however, must not jump to the conclusion that there is no need for him to acquire a considerable knowledge of mathematics, for he will find that the whole of the reasoning throughout the book is what may be termed "mathematical," although without any extensive use of the symbols which are supposed to be inseparable from that science; and unless his mind has been well trained in habits of close reasoning, he will find much difficulty in understanding the greater part of the work.

The object which our author has had in view has been to derive "methods of ascertaining the practical strength of any given section of beam, column, or arch, in cast-iron, wrought-iron, or steel;" and to show how the various data obtained as the results of the numerous experiments which have been made on those materials can be utilised for that purpose.

In testing the strength of a beam supported at each end, the best mode of proceeding is to apply a gradually increasing bending stress at the centre, the deflection and set being noted after each increment of stress; and to find the real value of the material we must know the *work done* in producing fracture, and this will be proportional to the product of *ultimate tensile resistance* and of *ultimate extension*, the toughest and best material giving the highest result if compared with others on that system. It is also requisite in judging of the quality of metal by experiment, to consider the *form* under which it is presented, as "by injudicious shaping the best material may be reduced to the level of the worst."

It has been shown by Mr. W. H. Barlow that there exists in beams an element of strength which he calls "resistance of flexure." Experiments upon beams which have the *web* small in proportion to the *flanges*, demonstrate that the law of *the strain being proportional to the load applied* is a tolerably accurate one; but that in beams of rectangular section the error arising from calculations made on that principle is very great. This error arises from the effect of *lateral adhesion* of the material being left out of consideration; but experiment shows that a powerful lateral action exists tending to modify the effect of unequal strains. This new *resistance* is dependent on the deflection in connexion with the depth of the metal, and is uniform for each unit of area over the whole cross-section; being due to the elastic reaction of the contiguous fibres, which will be a constant amount throughout the whole depth of the beam; the extension and compression of the several fibres being proportional to their several distances from the *neutral axis*.

The value of the *ultimate resistance* of the fibres is consequently always higher than the *resistance to direct tension* of the material; the quantity to be added being variable, and dependent upon the form of section. Its value, however, can be found for iron beams of any form of section, by help of the experiments which have been made on solid bars of the same kind and quality of metal.

The *moment of resistance* of a given cross section is the area of a flange multiplied by the depth of the beam, or the *effective* area multiplied by the *effective* depth. The *moment of the weight*, or strain, is the bending-force multiplied by the length of leverage at which it acts; and if this last moment is divided by the *moment of resistance*, we obtain the value of the resistance of the section to the same straining force. When the load is all at the centre of the beam (supported at each end), the *moment of the weight* is one-half the load multiplied by one-half of the span, that is, one-fourth of the product of span and load; if the load is equally distributed along the beam, the *moment* is half the above quantity, or one-eighth of the product of span and load. The value of the *moment of resistance* of a given cross section is determined on the supposition that every fibre is strained according to its direct distance from the neutral-axis, and that the effective leverage is also proportional thereto. On this principle it is easily shown that the *moment of resistance* of a square section having a side vertical is one-sixth of the cube of the side. If the diagonal of the square section is placed vertical, the *moment of resistance* is the same as before, but divided by the square-root of 2, or 1·414. In beams of any other section we must first find the position of the centre o gravity of the section, as through it the neutral-axis will pass. In a beam of T section, having equal thickness of metal throughout, the *moment of resistance* is half the square of the distance of the neutral-axis from the bottom of the T, multiplied by the thickness of the metal.

The variation in the strength of various specimens of cast-iron that have been experimented on amounts to 100 per cent., and it is generally found that remelting increases its strength. As an average of the experiments made on ordinary cast-iron, the ultimate resistance to direct tension may be taken as 16,502 lb. per square inch of section. A bar 1 in. square, having a bearing of 54 in., is found to have a breaking-weight of 464 lb. in the centre, the moment of which is 6,264; the *moment of resistance* is one-sixth the cube of the side; that is, $\frac{1}{6}$ in.: therefore, if we divide 6,264 by $\frac{1}{6}$, we get 37,584 lb. as the *apparent* resistance excited by the above load in a square cast-iron rod. Deducting from this last result the value (16,502) of the ultimate resistance to tension, we obtain the quantity, 21,082 lb. as the value of Mr. Barlow's *resistance due to flexure*; so that the *resistance due to flexure* is to the *resistance to direct tension* as 100 to 78.

It is shown, both by theory and experiment, that the nearer the centres of gravity of the portions of the cross section which are above and below the neutral-axis approach thereto, the higher is the value of the *resistance due to flexure*; so that in girders where the centre of gravity is near the extreme points of depth, the value of that *resistance* is very small, and may be practically neglected in the calculation Suppose it is required to find the section of a girder 12 in. deep, having a span of 16 ft., or 192 in., which shall carry a load of 10 tons at the centre, the strain per square inch of section not exceeding 2 tons; the *moment of the weight* is half the load multiplied by half the span (in inches), or 480; the *moment of resistance* is the area of the flange multiplied by the depth of the girder; and the resistance of the section being 2 tons per inch, we find the area of the flange to be 480 divided by the product of the depth (12 in.) and the resistance (2 tons), giving 20 in. for the area of the section of the flange. The area of flange of any other beam of given depth, span, and load, can be found in a similar manner by multiplying one-fourth of the span (in inches) by the load in tons, and dividing the product by *twice* the depth (in inches); the strain per square inch of section being 2 tons. Conversely, the area of section of flange of a cast-iron girder being given, together with the depth and bearing of the beam, the weight to be laid on the centre can be determined for any given strain per square inch of section: thus, multiply together the area of flange, the depth of the beam, and the given strain per inch, and divide the product by one-fourth the span, all dimensions being expressed in inches, and the weights in tons.

Wrought-iron is found to vary very greatly in tensile strength, the difference between several specimens being upwards of 90 per cent. The tensile strength of plate-iron is from 14¼ tons to 28 tons per square inch; and in bars, the ultimate resistance to tension is from 19¾ tons to 30½ tons per square inch. It is found in practice that the elastic resistance of the metal is overcome by about the same amount of strain per square inch, whether in compression or in tension, and on this account some engineers make the two flanges of a wrought-iron beam equal, although the usual plan is to give 20 per cent. more to the top (which suffers compression), than to the bottom flange, which suffers extension. The ultimate resistance to compression of a cube of wrought-iron may be regarded as practically

* On the Strengths of Beams, Columns, and Arches. By B. Baker, Assoc. Inst. C.E. E. & F. N. Spon, London. 1870.

unlimited; consequently, as in cast iron, it is only necessary to consider tensile strains. The mean tensile strength of Swedish bars, 2 in. square, is 42,133 lb. per square inch; and their breaking-weight at the centre of 25 in. bearing 14,000 lb. The *moment of this weight* is half the bearing multiplied by half the weight, or 87,500; and the *moment of resistance* of a cross section is one-sixth of the cube of the depth, or 1⅓. Dividing the former by the latter, we get 65,625 lb. as the *apparent strain* on the extreme fibres caused by the breaking weight; from this quantity subtract the tensile strength above given, namely, 42,123 lb., and the difference is 23,492 lb., representing the *resistance due to flexure*, which has been previously described. In wrought-iron bars, therefore, this resistance is rather more than one-half the tensile strength, amounting in bars strained with one side of the square vertical, to nine-sixteenths of the tensile strength, and in those with the diagonal of the square section vertical, to thirteen-sixteenths of the tensile strength. In beams of an I or H section the *resistance due to flexure*, is small, and can be found by multiplying the tensile strength, 42,133, by nine-sixteenths of the thickness of the web, and dividing by the width of the flange.

As an example we take the case of a beam of this section ⅓ in. thickness of metal, which was laid with 48 in. bearing, and the breaking-weight found by experiment to be 6½ tons. Taking the tensile strength at 22 tons per square inch, and multiplying it by nine-sixteenths of one-third, or three-sixteenths, and then dividing by 2·86, the width of the flange, we get 1·4 tons as the value of the *resistance due to flexure*; and therefore the *apparent resistance* is this last quantity added to 22, or 23·4 tons. Now, the area of flange multiplied into the depth of the beam being 3·24, the breaking-weight is calculated by multiplying 23·4 into 3·24, and dividing by one-fourth of the bearing, which gives 6·3 tons for the breaking-weight, or the same amount as obtained by experiment. The above example may be easily generalised into a rule for finding the breaking-weight of a wrought-iron beam of the same form of section, namely, divide three-sixteenths of the ultimate *tensile strength* per square inch of metal by the width of the flange, and add the quantity thus obtained to the said tensile strength; then multiply the last *sum* by the product of the area of the flange into depth of beam, and divide by one-fourth the bearing; the result is the breaking-weight of the beam in the middle, all the weights and strains being expressed in tons, and the dimensions in inches. If, instead of the breaking-weight, it is required to know what load the beam will bear in the middle, when the *ruling strain* is some fixed amount, such as 5 tons per square inch of section, we have only to substitute 5 tons for the ultimate tensile strength in the above calculation.

The following is the rule for finding the load in tons that may be laid on the middle of a beam of T section so that the fibres may be strained to a given amount, say 5 tons per square inch: multiply 5 times the area of the vertical web by half the depth of the beam, and divide by one-fourth of the span; all dimensions being in inches. For example, let a beam of this form be 3 in. deep, 3 in. wide, and ½ inch thick, the bearing being 60 in.; then the area of the web is 1½, the half depth 1½, and 5 times their product divided by one-fourth of 60 gives ·62 ton as the load in the middle that will produce a strain of 5 tons per square inch of section. The strength of T beams of wrought-iron can also be found in the manner described for cast-iron girders of the same form.

The great improvements recently introduced in the manufacture of steel are rapidly causing its substitution for common iron as the material of beams and railway bars. The quality of this material is greatly affected by the different modes of treatment which it undergoes in manufacture. Thus a specimen of cast-steel highly heated and cooled in oil bore 96 tons per inch, whilst a similar piece cooled in water failed with 40 tons, and another cooled slowly in ashes with 54 tons. Moreover, the resistance to *steady* tensile strain increases with the hardness of the steel, but at the same time there is a diminution in its power of resisting a blow.

The resistance to impact was 20 per cent. higher in the last of the above-named specimens than in the first, although the ultimate tensile strength was 44 per cent. less; and the same rule holds good in all kinds of steel. The mean tensile strength of Bessemer steel plates is double that of good iron plates, or about 40 tons per square inch; that of bars is still higher, being about 51 tons per inch. The rate of elongation varies inversely as the cube of the ultimate resistance to tension.

The resistance of short columns of steel to compression is practically unlimited; 98 tons per square inch having only produced a depression of 36 per cent.

From experiments upon various kinds of steel, it is found that the *resistance due to flexure* is from six-tenths to eight-tenths of the *ultimate resistance to direct tension* in square bars having the side vertical.

The following is the calculation of the strength of a steel rail of I section:—5 in. deep, 11/16 in. thickness of web, 2½ in. width of flange: the *moment of resistance* of the cross section is 7·8; the average resistance to direct tension, 45 tons; and the *resistance due to flexure* is taken as ⅔ of that to direct tension for a solid bar: but since the thickness of the web is to the width of the flange as 11 to 40, the *resistance due to flexure* for this section is ⅔ of 11, multiplied by 45 and divided by 40,—that is, 9·27 tons. Hence, the *apparent resistance* is 9·27 added to 45, or 54·27 tons. The ultimate breaking-weight at the centre of this beam, with a bearing of 43½ in., is found by multiplying the apparent resistance, 54·27, by the moment of resistance of the section, 7·8, and dividing by one-fourth of the span, which gives 38·9 tons.

The *stiffness* of a beam is its power of resistance to bending; so that if a beam, supported at its two ends and loaded in the middle, deflects from its original position before being loaded, the amount of that deflexion will indicate its *stiffness*; that is to say, the smaller the deflexion for a given load, the greater the stiffness of the beam. Hence it is said that the *stiffness* or *resistance to deflexion* is inversely as the *amount* of deflexion.

The laws of stiffness in beams are very different to those of strength or resistance to fracture. It has been generally assumed that the deflexion is proportional to the stress producing it; but this is not strictly true for any material, and in cast-iron the deviation from that law is found to be considerable under every degree of strain. In deducing a rule for finding the deflexion of a beam under a load not exceeding the *elastic limit*, we shall obtain a sufficiently near result if we take an average of the elongations and depressions produced by experiments, without complicating the question by considering the varying rates of deflexion under successive increments of load. We find that the mean result of experiments on pulling and thrusting bars of cast iron, 1 in. square and 50 ft. long, for the first three tons' stress is ·00018 per ton for each unit of length. Hence we obtain the following rule for the deflexion of a cast-iron beam of any symmetrical form of section, loaded at the centre to any extent within the elastic limit; multiply the tensile strain per square inch of section which the load produces into the square of the span, and also into the fraction ·00003, and divide by the depth of the beam; all dimensions being in inches, and the strain in tons. The ultimate direct tensile strength of cast iron is generally taken at 7 tons per square inch of section.

The deflexion of wrought-iron beams can be found in a similar manner, but since the resistance of this material to extension is greater than that of cast-iron, the deflexions with equal loads are less. As the result of numerous experiments, the extension of wrought-iron bars in terms of their length, within the *elastic limit*, which varies from 8 to 12 tons per square inch of section, is generally taken at ·0001 per ton, that is, the extension is 1/10000 of the length for each ton per square inch of direct tensile strain. It is also shown by experiment that the effective rate of extension per ton for every square inch of *apparent* strain, is constant for beams of every form of cross section, when subjected to transverse strain; and that the extension of fibres under similar apparent unit strains is unaffected by the agency exciting those strains. The deflexion of any wrought-iron beam of uniform section, under a central load, when strained within the elastic limit, is found by multiplying the square of the span into the strain per square inch of section, and dividing by the depth; the result multiplied by the fraction ·000017 gives the deflexion; all dimensions being in inches, and the strain in tons.

The *stiffness* of steel is greater than that of either cast or wrought iron, but the deflexion of a steel beam, under a given load, can be found with sufficient accuracy by a rule similar to those given for iron, the only difference being in the constant multiplier. For average qualities the mean extension of a bar, 1 inch square for each ton of strain, is found to be ·00008, or 1/12500 of its length, and the same result is obtained by experiments on beams laid between supports, and subjected to a transverse strain. This is four-fifths of that obtained in wrought-iron, or the relative stiffness of steel and iron beams of similar section is as 5 to 4. Hence we obtain the following rule for the deflexion of a steel beam of uniform section, loaded in the middle to any extent within the elastic limit; the square of the span, multiplied into the strain, in tons, per square inch of section, and divided by the depth of the beam, the result being multiplied by the fraction ·0000133, gives the required deflexion, all dimensions being in inches.

Wood, as a material for beams, is now made to play a very subordinate part in large engineering structures; but as it still forms an important material in architectural works, it is necessary that we should have correct data on which to ground our calculations of its strength and stiffness. Experiments made upon small pieces of wood of selected quality are found to give much higher results than those made upon large pieces such as are commonly used in practice. Taking average specimens of pine and oak of ordinary scantlings, we find that the breaking-weight reduced to that on a bar 1 in. square and 12 in. long, loaded in the middle, is 2·2 cwt. for pine, and 2·75 cwt. for oak. Hence we obtain the following simple rule for the breaking-weight of a beam at the centre; multiply the square of the depth into the breadth, and divide by the span; then multiply the result by 1·65 for oak, and by 1·32 for pine, and you have the breaking-weight in tons at the centre, all the dimensions being in inches. The ultimate strength of these beams may be also found by putting 2 tons per square inch for pine and 2½ tons for oak in the rules previously given for the strength of iron beams; these being the ultimate strains per square inch of section which the fibres will bear.

The *stiffness* of beams of wood may also be determined in the same way as for those of iron, the average elongation of a bar of oak or pine being ·0022 and ·003 of its length per ton per square inch respectively. Hence we find the deflexion for any load at the centre, straining the beam with any force per square inch of section within the elastic limit, by the same rule as for iron beams; namely, multiply the given strain in tons per square inch into the square of the span, and divide by the depth; the result, multiplied by ·00037 for oak, and by ·0005 for pine, will give the amount of deflexion at the middle of the beam; all dimensions being in inches. The practical difference in strength and stiffness of oak and pine is not great, where beams of large scantlings are employed; oak being one-fourth *stronger* and one-third *stiffer* than pine.

When any portion of a structure has to support a weight acting vertically down its axis, it may be considered as a *column*. The strength of a column, or its resistance to pressure acting in the direction of the axis, depends very greatly on the relation between its length and diameter; a flat piece of material, even if it be of soft wood, will bear an almost unlimited pressure, which reduces its thickness, but at the same time increases its hardness. In order, therefore, to test the real resistance of material to a crushing force, the height must not be less than 1½ times the width at base; in pieces of cast iron of this form, the average resistance to crushing of good metal is 49 tons per square inch of section, and in wrought iron about 16 or 18 tons; the compressive strength of mild steel is about 1¼ times that of the best wrought-iron, and that of fine-tempered steel about three times that of iron.

In the experiments on the compressive strength of various woods there are great discrepancies; so much depending on the degree of seasoning, as moisture facilitates the failure of wood by splitting. The resistance of elm is 92 cwt. per square inch; that of English oak, 90 cwt.; of American oak, 67 cwt.; and of pine, 54 cwt.; but the strength of all will vary according to the dryness of the specimens.

In columns having a length amounting to several times the diameter or width of base, the compressive force acting down the axis produces a tension tending to cause failure by bending. The strain, therefore, on a column is partly transverse and partly compressive; where the length is very great as compared with the

diameter, the transverse strain is the principal one to be considered, but there is also an initial compression due to the insistent load uniformly distributed over the cross section, which is sufficient in effect to make the circumstances different to that of a beam strained by a transverse force alone. In columns of which the length exceeds thirty-five times the diameter, experiments show that the influence of resistance to compression is imperceptible, but that below that ratio it must be included in the calculation.

The strain on a column results from two distinct forces; one acting along the axis which is inversely proportional to the area, and the other perpendicular thereto, which varies as the *stiffness* of the material. The former of these forces being the average compression per square inch of section, is the load divided by the area in square inches; and the latter, or the bending force, is proportional to the compression and to the square of the *ratio of the length to the diameter*, and also to the increment of length received within the elastic limits. In this way we obtain, by a comparison of the results of numerous experiments, the following rules for finding the breaking-weight of solid columns having flat parallel ends, the load being laid uniformly over the whole section, and pressing directly down the axis.

To find the breaking-weight in cwts. per square inch of section of round cast-iron columns, add 330 to the square of the *ratio of length to diameter*, and divide 270,000 by the sum. The safe permanent load may be from one-fifth to one-seventh of the breaking-weight obtained by this rule.

To find the breaking-weight in cwts. per square inch of section of round wrought-iron columns; add 2,000 to the square of the *ratio of length to diameter*, and divide 680,000 by the sum. The safe permanent load may be one-fourth or one-fifth of the breaking-weight.

Comparing the results obtained from these rules, we find that when the length is from five to ten times the diameter, a cast-iron column is twice as strong as a wrought-iron one of the same size; when the length is from fifteen to twenty times the diameter, the strength of a cast-iron column is one and a half times that of a wrought-iron one; when the length is from twenty-five to thirty times the diameter, the strength of wrought-iron and of cast-iron columns is about equal; when the length is from thirty-five to forty times the diameter, the wrought-iron column is one-third stronger than the cast-iron one; and when the length is above fifty times the diameter, the wrought-iron column has double the strength of the cast-iron column.

The breaking-weight of square columns of wood, whether oak or pine, is nearly the same, provided the length is over fifteen times the diameter; the rule being, add 350 to the square of the *ratio of length to diameter*, and divide 17,000 by the sum: the result gives the breaking-weight in cwts. per square inch of section. To find the breaking-weight of an oak or elm post less than fifteen diameters in length, multiply the breaking-weight just found for long pillars by 45, and divide by the *ratio of length to diameter* added to 30. The safe permanent load may be from one-seventh to one-tenth of the breaking-weight.

To find the strength of a *round* wooden column, we must first substitute eight-sevenths of the actual *ratio of length to diameter* in the above rule for the true *ratio*, and proceed as before.

To find the strength of a *square* iron column, we must substitute seven-eighths of the actual *ratio of length to diameter* for the *ratio* in the above rules for *round* columns, and proceed as before.

In calculating the strength of hollow columns, the thickness of metal must be considered: when the thickness of the metal is one-tenth the diameter, take three-fourths of the *ratio* instead of the actual ratio in applying the before-mentioned rules: if the thickness is one-seventh the diameter, take four-fifths of the *ratio*; if the thickness is one-fifth the diameter, take seven-eighths of the *ratio*; and when the thickness is one-fourth the diameter, take nine-tenths of the *ratio*.

For finding the strength of columns of L, T, or + sections, the *ratio* must be multiplied by $1\frac{1}{3}$, $1\frac{1}{6}$, $1\frac{1}{7}$, and $1\frac{1}{8}$, to obtain the equivalent ratio in the before-mentioned thicknesses of metal as compared with the diameter; pillars of these last sections being weaker than solid pillars containing the same quantity of metal; whilst hollow columns are stronger than solid ones for the same quantity of metal.

In order to find a rule for the strength of a steel column, we may suppose that if a bar is bent by a force at the middle, and kept so bent by a tie-rod attached to its extremities, the strain on the tie will represent the weight the bar will sustain as a column if set upright and loaded at the top: so that, by aid of the rules for deflexion of beams, we can deduce the value of the elastic reaction, since the strain on the tie is the same as the thrust of an arch having the rise represented by the deflexion, and the load by the lateral stress producing it. Hence we obtain the following rule for the breaking-weight of a *round* steel column in cwts. per square inch of section: for mild steel, add 1,400 to the square of the *ratio of length to diameter*, and divide 840,000 by the sum. For strong steel, add 900 to the square of the *ratio*, and divide 920,000 by the sum. In steel columns of *square* section, the strength per square inch is one-third greater than in round ones. The strength of a long column may be considered as exactly proportional to the stiffness of the material.

WORKS OF ROUBILIAC IN TERRA-COTTA.

In many former numbers of this journal we have discussed the subject of the capabilities of *terra-cotta* for architectural purposes. We have referred, first, to the great antiquity and permanent durability of burnt earth; then to the use made of this material in Asiatic and in Italian art; and, lastly, to the mode in which the work of the mere decorator rises into that of the sculptor, as is especially the case in the enamelled *Della Robbia* ware.

In investigating the history of ornamental and structural earthenware in this country, we have been struck with the fact, that it is to the sculptor of some of the best marbles to be found in England that we also owe some of our most spirited and instructive specimens of statuary in terra-cotta.

Roubiliac appears to have been in the habit of first working out, in a clay which is not that usually employed for the purpose, those conceptions which he afterwards embodied in marble. Not only did he, like other sculptors, study in a plastic material, but he submitted his sketches to the fire, and has thus left, should they ever be collected together, a most instructive series of his productions in successive stages of perfection.

We are not about here to enter into the question of the proper rank of Roubiliac as a sculptor. By his contemporaries it was unquestioned. By most writers of authority since his time it has been undisputed. Lord Chesterfield said that the Gascon artist was "a true sculptor, while his contemporaries were no more than stone-cutters." Allan Cunningham, by no means given to compliment, calls Roubiliac "a genius and a gentleman." The effect of his works, especially of the terrible "Death" in the Nightingale monument, on the public mind, was extraordinary in his time; nor does it seem to be much less forcible at the present day, if one may judge from observation of the groups that make the tour of the chapels of Westminster Abbey. But, on the other hand, there are men not devoid of taste who sneer at the allegoric conception of certain of Roubiliac's monuments. A word on this subject is therefore not altogether uncalled for, when we refer to the works of this artist in terra-cotta.

The vigorous and energetic protest embodied in the works of Hogarth against the "Goddess and Shepherdess, the Roman Emperor school of portrait-painters and their patrons, the collectors of fiddle-brown saints and ropy-tendoned martyrs, of pseudo-Titians and second-hand Raffaelles," to use the vigorous language of Mr. Redgrave, may perhaps be more fully appreciated in our day than it was in his own. It was the attempt of an original genius to draw its inspiration fresh from nature, when the style of such remains of academic teaching as the century could boast had sunk from the conventional into the simply contemptible. It was a protest such as that which was made by Wordsworth and his school against the followers of Pope; a protest of self-taught genius against classified dulness and incompetence reduced to system. It was, like so many attempted reforms, a work commenced on a low plane. There is an honest and hearty vulgarity about Hogarth which reminds one of the outspoken German of Luther. The English painter saw what was true; he saw how much that truth exceeded the false feebleness of the time. So far he did well; but he seemed unaware that excellence in art requires not only truth, but noble truth. It is not merely nature that should inspire the artist, but nature in her loftiest moods of beauty, of pathos, or of grandeur. Hogarth was a student of nature; he was, moreover, influenced by a sound and well-intentioned morality; but he did not rise to the level of an artist who at once elevates, purifies, and ennobles the soul, by the imaginative representation of the grander aspects of nature.

In the arts of the painter and of the engraver there are, however, different strata of excellence. Hogarth wrought on a low level, but he wrought well on his selected plane. In sculpture the case is altogether different. That severe and lofty art lends her aid with difficulty, almost with shame, to any but the nobler phases of imitative skill. Satyric sculpture, comic sculpture, burlesque sculpture, are pseudo forms of the art; which they caricature as the monkey does the man. We may admire the cleverness shown in the clay figures which grotesquely recall the features of contemporary notorieties, or in the curious monstrosities of Japanese carving. But we look at these things as we do at wax models. We appreciate the talent of their authors, but we cannot regard them as sculpture.

Bearing in mind this limit to the range of the sculptor's province, it is impossible to refuse to Roubiliac the title of a reformer and restorer of taste in plastic art, not less energetic, although far less homely, than Hogarth was in painting. The painter or the draughtsman may, to a very great extent, follow the bent of his own genius. The sculptor works always in fetters. The costliness of the material in which his ideas can alone take their fairest form is in itself a very great barrier against the exercise of original power. In monumental works not only have the tastes and wishes of the family for whom the artist is to toil to be consulted,—frequently as to those questions of size, of locality, of execution in relief or in the round, which the freer pencil of the painter overleaps at a single bound,—but the requirements of the architect often cramp the genius of the sculptor. In some of Roubiliac's larger monuments the bad effect of the architectural requirements of his day may be distinctly traced. Monumental effigies, by the middle of the eighteenth century, had assumed stilted and ostentatious proportions. The modest brass, reminding the worshipper of the dust beneath his bones, and pleading for a prayer for the soul of the departed, no longer recalled the lineaments or the heraldic bearings of the dead. The simple effigy of cross-legged knight, the grand simplicity of the plain coffer-shaped tomb, such as that sacred to the memory of our first Edward,—had given way to the costly frippery of canopies and shrines. To cover with marble panelling as much of the time-stained diaper of a thirteenth-century wall as might assert the importance of the defunct, came to be considered a point of honour among those who could afford the cost of stately monuments. At times an entire chapel was occupied by a ponderous composition, as in the case of the weeping Virtues that watch the last repose of Lodovick Stuart, Duke of Richmond, and the substantial Fame that is perched upon the floriated metal canopy over his head; or the corresponding bronze tabernacle dedicated to the excellence of Villiers, Duke of Buckingham. It was not enough that Allegory should be made to bear false witness over the tomb. Portraiture was equally corrupted. One of the finest marble statues in London, that of William III. in the hall of the Bank of England, represents that Dutch warrior in the armour of a Roman general, with bare legs and buskins; or, at least, in such a conventional representation of Roman armour as suited the uncritical notions of the time. Sculpture, like painting and poetry, had passed, by the commencement of the eighteenth century, into a pseudo-classic, melo-dramatic, stage; and the representations of the flowing wigs that assumed their fullest proportions when the long and curling locks of Louis XIV. had been replaced by the productions of the hair-dresser, were almost the most unartificial part of the attire rendered historic by the sculptor. Vanity called on subservient art to represent great men as heroic. The only result was that they were drawn like the heroes of the stage.

Against this apotheosis of toad-eating and bad taste, Louis François Roubiliac entered a sculptor's protest. He could not suddenly or altogether purify a depraved public taste; but he did all that was possible to exalt and ennoble it.

He could not control the vain and tasteless desire to occupy large wall-surfaces by the accidents of monumental luxury; but he detached, as far as possible, his own design,—the actual sculpture,—from the pyramid, or obelisk, or storied tablet, that formed the heavy and incongruous background demanded by the fashion of the times. He could not throw aside the aid of allegory; for monumental sculpture which should not allegorically praise the virtues of the departed would have found few admirers, and no purchasers, in his day. But he reduced the allegorical features of his designs within the limits of poetic, or rather artistic, licence. Time and Death, the two great conquerors of mankind, —Strength, Wisdom, Eloquence—the Muse of History,—such were the accessory figures which he introduced into his well-balanced groups. In portraiture he was truthful and exact, with a fidelity to costume which might even be termed mechanical, were it not for the pictorial grace with which he disordered the attire proper to his subjects. And when we turn from those larger and more complicated monuments in which, executed as they were at the public expense, the sculptor was most fettered by the public taste of his day, to the busts and single statues of Roubiliac, we know not whether most to admire the truthful realism of portraiture and of dress, or the grand and noble air which invests all that might, less skilfully treated, appear mean and paltry in detail, with an effective sculptural truth that appeals forcibly to the imagination.

As to the perfect mastery which he exercised over marble, there has never been but one opinion regarding Roubiliac. His executive power has never been surpassed. It is not easy to point to instances in which it has been even approached. The hand of Mrs. Nightingale, in which life seems to be just ebbing from the veins; the anxious, terror-stricken glance of her husband; the pleading, persuasive rhetoric that breathes alike from the attitude and the expression of the Argyle Eloquence; the anatomy of the skeleton (which is at least as poetical as the "Death" of Euripides), gliding from the tomb; the plucked feathers and worn stumps of the wings of Time, when his course is run; are each as faithful renderings of nature as are the wrinkles in Shakspeare's stockings, or the careless creases in his doublet. In fact, the exquisite finish which the chisel of Roubiliac gave to dress, and hair, and all the accessories of his figures, is such that it would withdraw the attention from the higher ideal characteristics of his compositions, had they been less signally stamped by the very highest impress of the genius of sculpture.

In his single figures,—the Locke, the Handel, the Shakspeare, — perhaps, above all, the Newton,—the power and taste of Roubiliac are most distinctly to be appreciated. The Handel in Poets' Corner was left partly unfinished at the sculptor's death. The score of Handel's own setting of the words, "I know that my Redeemer liveth," lies open before the great composer; who is represented as listening to that heavenly music of which he has left us no feeble or indistinct echo. For the Shakspeare, which was executed for Garrick (and left by his widow to the nation), that actor himself sat, or rather stood. The attitude was not chosen by Roubiliac, but by Garrick. Miserably lighted as that statue is, in a corner of the hall of the British Museum, the attention of the spectator is yet divided between the grandeur of the head and the felicity with which the attire is rendered, in a manner at once exact and pictorial. There is more labour of finish bestowed on a single limb of one of these figures than on the entire superficies of some of the statues that adorn our public places in honour of certain great men of our day. The Newton, in the ante-chapel of Trinity College, Cambridge, which Canova pronounced the finest statue in England, and one of the finest in the world, is also capriciously lighted. The position of the hands, holding a prism, is not that of the original design, but was a subsequent pose adopted in consequence of a flaw in the marble. Whatever was the cause of the change, the result is not such as to be regretted.

It is on the ground of this accuracy of detail and elaborate minuteness of textile finish in the marble works of Roubiliac, that it becomes so highly interesting to contemplate the productions of this artist under his hitherto disregarded character of a worker in terra-cotta. We intimated that there is ample evidence that he not only moulded his designs in clay,—a small sketch preceding a full-sized model,—but that he was in the habit of baking and preserving his models. We do not speak from mere surmise. The South Kensington Museum contains the terra-cotta sketches of his statues of Locke and of Shakspeare, the first 23 in., the second 17 in., in height. Mr. F. Roubiliac Conder, the great-grandson and representative of the sculptor, possesses, among other relics, the original sketch in terra-cotta of the monument of Sir Peter Warren, in the north transept of Westminster Abbey. The corresponding terra-cotta sketch of the Nightingale Monument is in the rood-loft of Westminster Abbey,—Death gone, and the head of Mr. Nightingale gone, but the fainting form of the lady fine and effective. In the National Portrait Gallery at South Kensington (which has recently purchased Carpantiers' beautiful portrait of the sculptor, engaged in modelling the very statuette of Shakspeare before referred to) is a bust of Hogarth, a little smaller than life. A life-size bust of Shakspeare continues the list, an admirable specimen of modelling, with the sharp lines struck by the modelling-tool fresh and distinct; the mouth and moustache wonderfully expressive and delicate. Mr. Murray bought the original clay model of the bust of Pope, now the property of Sir Robert Peel, at the sale of Samuel Rogers. In a contemporary crayon portrait of Roubiliac, in the possession of Mr. Conder, the sculptor holds a life-sized mask of Medusa, also in baked clay, on which he is at work. The existence of these eight examples of work in terra-cotta by a sculptor of whom comparatively so few works are extant or on record, is conclusive as to the habit of the artist. It is probable that more are yet to be collected.

The chief characteristics of these models, and more especially of the smaller ones, are the perfect freedom, *abandon*, and "go" which the sculptor has impressed on the clay. There is no elaboration of detail—no unmeaning prettiness of feature. On the contrary, the faces are sometimes anything but pleasing, although they never fail to be expressive. The face of the miniature Shakspeare is blunt—almost coarse. That of the little Locke is highly characteristic. That of the female figure in the Warren monument, which in the marble has a somewhat *retroussé* nose, gives the idea of the more delicate face of the statue, evidently a portrait, by a sort of rude forshadowing. The Shakspeare and the Hogarth are carefully but yet boldly modelled, both in features and in dress. In a word, the style proper to clay is as admirably illustrated by the *terra-cotta* works of Roubiliac, as is the style proper to marble by his finished works in that noble material.

Roubiliac threw his thoughts upon paper before he rough-hewed them in clay. The original sketch for the Argyle monument is now in possession of a distant connexion of the sculptor's family. It was inclosed in a box, with an attached memorandum to the effect that it was the design contemplated in the agreement between Louis François Roubiliac and her Grace the Duchess of Argyle. The design gives but small promise of the vigour and beauty of the work. In the early terra-cotta sketches, on the contrary, the fire of the sculptor's genius has caught and informed the rude material. These models are not anatomical studies, like some of the most valuable relics of Italian art, but true sculptural sketches, in which the form and disposition of the drapery have received as much attention as the drawing and attitudes of the figures. The folds of the gown of Locke were as present to the imagination of the sculptor as was the power and intelligence of his brow. The drooping fall of the flag, behind the bust of Sir Peter Warren, serves to combine the attendant figures into one group, harmonious with the bust, which the male figure is so gently placing on the tomb. As the appropriate garb of their day forms a part of the individuality of all duly authenticated ghosts, so in the works of Roubiliac are we presented with the subjects of his portraiture as they lived and moved; the men and women known to their friends, but seized and immortalised under their very happiest phases.

The use made by Roubiliac of terra-cotta is more especially worthy of note from the extreme fastidiousness of that artist as to material. The marble of his statues is always perfect. It is singular in its purity. The Gascon sculptor has been known to dash in pieces a partly-finished statue, because of the appearance of a flaw in the marble which he could not avoid, and would not patch. Unlike Nollekens, who has been detected in sawing off and replacing the head of a figure, Roubiliac was inexorable in his demands for spotless marble. Hence, in some degree, the limited number of his works; hence, he died poor; but hence, in no slight measure, his fame.

The most important lesson to be drawn from the comparison of the works of Roubiliac in terra-cotta, with the statues of the same sculptor in marble, is the illustration of the fact how much more appropriate style depends on the material than on the special taste of the artist. The sculptor who, of all others, was the most delicately fastidious in the choice of the finest marble, and the most scrupulously exact in giving a finish like that of Nature herself to his work in that precious substance, throws clay into form with all the careless energy of a master at play. For the student,—and what artist ever ceases to be a student?—the lesson is one of no little value. Let every artist select the medium by means of which he can best give form to the conceptions of his imagination. But let him remember that, the medium once selected, excellence can only be attained in the style proper to that medium. Art has her own laws, which none can disregard with impunity. The author of a bald, conventionalised, unfinished effigy in marble or in bronze will never attain the fame of a sculptor, any more than will the artist who should endeavour to manipulate clay until he teases it into the likeness of wax work. The sculptor in the round, the sculptor in *relievo*, the modeller in clay, the modeller in wax, the carver in wood, the carver in ivory, the founder in bronze, the worker in *repoussé*, the chaser, the gem-cutter in *cameo* or in *intaglio*,—each has a certain limit of style and of scale proper to the material in which he works. He may, it is true, excel in more than one, or even in many, of these several branches of art (as Cellini and Da Vinci did in their day), but he will never, by a confusion of style, lose the characteristic beauty of each. In whatever province of sculpture the student may feel most anxious, or most able, to excel, let him bear in mind that it is by the masterly treatment of clay that the sculptor will best lay the foundations of future eminence.

THE ART AND ENGINEERING JOURNAL OF THE MILANESE.*

THE professional Milanese journal bearing the title of *Il Politecnico* has now fulfilled its useful mission for eighteen years. After the manner of the workings of men in the nineteenth century, it carries on the reputation Milan maintained of old as a seat of art and constructional science. If we can no longer find at Milan Cathedral the schools of sculptors and artists we should have found busy there in the Mediæval centuries, we have this disseminating medium in good working order as part compensation. In the number before us we have word of great works, and read of earnest endeavours to set on foot still more important public enterprises. Marco Frisone da Campione and his Campionesi, Jacopino da Tradate, Amades, Solari, and the various artists attached to the Veneranda Fabbrica, have passed under the guidance of death into another world, and their places know them no more; but, instead, we have a college, or association, of engineers and architects numbering 175 members; and *Il Politecnico* shows us that many of them are good men and true, doing their measure of work for this generation,—which measure is all the better and fuller, doubtless, for the example and remembrance of the masters we have mentioned.

The journal before us opens with a minute account of the plan of a new provincial palace, for the transaction of the business of the Prefecture and other branches of the public service, in Bergamo. This is followed by a paper upon the possibilities of the cultivation of beetroot in Italy. Then a report by Dr. Luigi Gabba, made for the Minister of Public Instruction, is given, which relates to the researches in the laboratory of Messrs. Lawes & Gilbert, who, with the usual Continental obscurity in the matter of names of English persons and things, are located at *Rothamsted*, near London; a paper, by Professor Camello Grada, on a new mode of measurement, he calls *Nonio Fisso*; some observations relating to the amount of a due water supply; and the rest of the bulk of the journal is devoted to the proceedings of the College of Engineers and Architects we have mentioned. Beyond the business usually transacted at meetings of pro-

* Il Politecnico, Giornale dell' Ingegnere Architetto Civile ea Industriale. Anno xviii., Num. 1 e 2. Geunaio e Febbraio, 1870. Milano, Tipog. e Litog. Degli Ingegneri, via Lupetta.

fessional or amateur societies of the kind, the chief questions of interest before the members were details relating to the canals for the irrigation of Lombardy, conceded to the engineers, Sig. Villoresi & Meraviglia, which occupy a large space. A commission of five Milanese engineers was appointed to examine and consider the project, and the information brought before the college is the result of their deliberations.

The proceedings of the Italian Society of *Scienze Naturali* are briefly given for the year 1869, when the re-union was held at Catania, and numerously attended, including a letter, addressed to the Society, by the Alpine Club, detailing their botanical achievements. Shorter, still, is a report of the proceedings of *Geodesica Nazionale* Association, notwithstanding this also includes a letter from another society, a fifth association of *savans*, the *Societa Eidypsometrica*. All tell of work and progress. The journal itself is most creditably conducted.

SCIENCE IN ARCHITECTURE.*

AN architect's specification is a good illustration of what constitutes science in architecture. In this paper I purpose dealing with some of the points that the carrying out of a specification suggests.

FOUNDATIONS, DRAINS, AND BRICKWORK.

The best foundation, as a general rule, is growing sand, and the least number of settlements are usually observed to buildings upon this foundation. Rock, known to be solid, is equally good, but rock is often treacherous, such, for instance, as may be found about Litherland. Most of the houses in Litherland Park are upon rock, and they have given seriously. Faults in the rock, holes, loose strata, or soft stone underneath may give, and if the rock does give, from any cause, the building receives a shock resulting in the usual defects of serious settlements. Growing sand will not give in this way; it has often a tendency to expand rather than to sink, and if it gives it does so but little, and that evenly, and does not hurt the structure upon it.

For the same reasons that make rock doubtful as a foundation, clay is more so: there may be, though hidden, what is technically termed ravines or other holes in the clay; these cause the structure to slip. If a solid bed can be assured, the architect may determine upon building without fear, but this is often impracticable. A thin bed of clay with rock underneath is a very treacherous foundation; the clay is almost sure to move, and should therefore be excavated. Cracks in buildings do not always arise from settlements in the foundations or defective work. All buildings have a tendency to settle and contract as the materials with which they have been built become dry. Brickwork, for instance, must contract and settle to some extent, and stone put into a building fresh from the quarry is more or less wet, and will shrink in some degree while drying. This accounts for the open joints sometimes visible in new buildings; these cannot be altogether avoided; better that this appearance, which can easily be set right, should exist, than the stone be made so tight that it will snap when contraction begins, and the materials dry. We require cills and steps to be bedded hollow for this reason, to provide for the results of contraction.

DRAINAGE.

Drains, where there is not much fall, are best of brick or of unglazed tiles, the idea that glazing improves drain tiles for all purposes is not correct. It was at first thought that the invention would cause the soil to pass easily through, but, instead of that, experience proves that in flat drainage the soil clings to the glazing far more tenaciously than to the unglazed material. It may be accounted for in this way; the glazing keeps the sides of the drain pipes very dry; they are so impervious that water cannot be communicated from the outside; and the soil will cling to the dry article while it will fall from the wet one, or be easily removed by a slight flushing of the pipe. Unglazed pipes are generally wet when in use, because moisture from the outside earth soaks into them, and the moist surface thus presented to the soil keeps the whole in a favourable state for the removal of the soil when a slight flushing takes place. Brick drains are for the same reason much better than glazed stoneware. I have known 6-in. drain tiles taken up in the neighbourhood of Liverpool, after having been laid but a year or two, and soil 2 in. thick has been clinging to the sides all round, fast, like mortar, leaving but 2 in. for water and other drainage to flow through; such pipes must evidently soon become choked up. This instance occurred where the ground was flat. Brick or unglazed pipes should be used in such cases. Where there is a good fall glazed pipes may be used, as they are more durable. Within the last few years we have known drains laid about Liverpool of 18-in. glazed pipes where there has not been much fall, and where the drains have often run 18 ft. below the ground level; these, it seems to me, are liable soon to choke from the cause named, and then how are they to be cleaned? Flushing will not take the soil off; it clings so fast to the smooth surface that forcible pressure is necessary, and at such a depth it is not safe for men to go down 18-in. pipes. A good brick drain would cost very little more, and would answer better in every way. In such rocky ground as is to be found about Liverpool a cheaper drain than the glazed pipe might often be obtained by cutting an opening in the rock and covering it with flags, and this would answer every purpose.

If drains are laid in running sand, it is better to set them in cement, then cover the joints with clay, as the sand will otherwise find its way into the drains before the cement is dry and choke the pipes; by covering this cement with clay, the latter, which will not at once let the water soak through, becomes a covering to the cement long enough to let it harden, and though the clay will in time be washed away, it will then have done its work.

In ordinary foundations, as generally understood, clay only is the best bedding for drains; there is no fear of the earth or growing sand getting into the pipes, and the clay allows them to yield to a pressure which might break them if set in cement. Of course, the danger of the pipes breaking, in case of an uneven pressure, when they are set with cement in running sand, still remains; but this is the less evil of the two, and must be borne.

MORTAR.

Mortar is better old than quite new; it is a mistake to specify,—"only new mortar is to be used." It is with mortar as with clay for bricks, if clay is used for bricks after having been tempered but a short time, the result is apparent in inferior bricks; they are brittle, and will not stand fire or weather; but if the clay is allowed to lie a long time it consolidates, works together, bonds, and makes tougher and more durable bricks: so if mortar is used while fresh, it is brittle, technically—short, the particles do not bind; but if allowed to stand for some days, the particles work well into one another, the whole becomes tough and clammy,—a great essential. When we try mortar, as architects, we like to feel it tough and clammy; but we cannot obtain this so well if we require it fresh. The difference between modern and ancient usage may account for our modern mortar not being so good as that of the ancients. Our mortar is now, as a rule, used fresh; in olden times it was frequently buried for twelve months before using. Mortar, though not used fresh, should be protected, according to the weather, and be kept moist; it is injured if allowed to become so dry as to require remixing.

It seems to me a belief is current that mill-made mortar is necessarily better than hand-made. I cannot agree with this notion. We were told last meeting that in the building of concrete houses fine sand separates from the cement, does not bind, and that coarser material is better. We all know this to be the case with cement work, hence we specify gravel; for the same reason, sand in mortar will not bind so well with the lime if ground fine in a mill, but is better for being coarse, while the bonding of the separate ingredients accomplished by the mill is, in hand-made mortar, better secured by capillary attraction when allowed to lie unused for a few days. The ancients, or Mediæval builders, it is evident, did not use any mortar to correspond with our mill-made; if old buildings are examined, it will be found large particles of the ingredients still exist in the mortar, showing material very much like gravel has been mixed with the lime. Another reason why mill-made mortar does not in practice prove so good as hand-made is, the men at the pug-mill will, however they are cautioned, throw in soft broken bricks and other refuse to grind up with the sand; and this refuse will not adhere so well to the lime as sharp sand or gravel. If men merely screen the sand for mortar, they cannot adopt this practice. Mortar for pointing is now sometimes buried from force of circumstances. If too much is made the builder buries it, and never finds it worse for such treatment. Mortar for pointing should not have much burnt marble in it, as the burning of the marble destroys its nature. Ground refuse from glass-works is now very frequently used for pointing, and with great success.

SMOKY CHIMNEYS.

It would be out of place here to attempt to deal with this evil in detail. I will simply allude to one principle only, apart from defective building, and the numerous inventions as remedies. It will invariably be found that chimneys have a tendency to smoke when at the side of a house where no building the same height adjoins. The space at the side of the house being sheltered forms a vacuum, and as wind passes over the building, it has a tendency to fall down and fill up this vacuum, and in so doing it rushes down the chimneys at that end of the house. This explains why such chimneys smoke during particular winds only. They do not smoke when the wind blows directly against them, but when it comes from an opposite quarter passing over the roof of the house. This, of course, suggests the necessity of making special preparations for all chimneys in such positions. A good curve to the flue will often prove sufficient. Chimneys smoke worse in Gothic houses, because the vacuums created are more numerous. In flat-roofed houses, if the chimneys are in the middle of the roof there is not much fear of their smoking.

MASONRY.

The frequent failures in the use of Bath stone in and near Liverpool,—the utter want, as it has appeared to me, of its adaptability to our clime,—have often attracted my attention, and I have tried to find out the reason why a stone of such pleasing appearance, and so useful in working, could not be more generally used by us. When in Bath, a short time ago, I had an opportunity of paying attention to the subject. I soon came to the conclusion that the cause of failures in the use of this stone in Liverpool exists mainly in applying to the wrong quarries for stone for outside purposes.

If we require a good stone for outside purposes, we should specify "Box Ground," or the "Combe Down" stone. These are the most durable; they work freely, and the former is considered equal to Portland stone in durability, while much cheaper. The Combe Down stone was used in the building of Bath Abbey; nearly 300 years have elapsed since this abbey was restored, and yet many of the mouldings are still perfect. The Combe Down stone is not equal, on the whole, to the Box Ground; for outside purposes it requires to be selected, but when selected, gives great satisfaction; the blocks are not so large as those of the Box Ground; its texture is hard and coarse.

The Box Ground is coarser and harder than any of the Bath stones, and while most sorts will go to pieces in frosty weather, this will stand the hardest frost. It may be safely used for any external work, plinths, copings, or weatherings. Laying Bath stone on its proper bed has a great deal to do with its lasting well. This may always be determined by the thin black veins which run up the bed; they never run in the bed; and in some of the stone there are hard black veins termed lists or ribs; these always run in the bed and never across. The Box Ground stone can be obtained in lengths of 12 ft. 6 in., or 14 ft. 6 in.; the blocks vary in size from 4 ft. to 120 ft. cube.

The Corsham Down stone is the best to specify for inside purposes. It has a beautiful warm colour, and looks more effective than any other; while the other stones alluded to are very coarse, this is, on the contrary, of very fine texture, but durable and strong. It is free and easy to work, as, indeed, are all the Bath stones. It absorbs a great deal of water, and so in hard frost requires to be covered up, as it would burst if left exposed. It is the most regular in quality of all, and considered the best of our English stones for internal work. Patches of dark blue or slate-colour are sometimes found. These portions work in with the rest for ornamental effects in chimney-pieces, &c. The stone is sounder where these patches exist.

Another sort is the Farleigh Down stone, the principal feature of which is, that the quarry contains two beds, the red bed and the white

* By Mr. Wm. Parslow. Read at meeting of the Liverpool Architectural Society. Some of the opinions expressed are open to discussion.

bed. This stone does not stand the weather well. It is more easily worked than any of the others; but the appearance is not so pleasing as the Corsham; it dries out often in red patches, giving an appearance termed foxy. It is in great demand in the neighbourhood where quarried, because of its price and easy working, but has no advantages to offer for Liverpool.

MARBLE.

With reference to this material for lavatories, wall-linings, chimney-pieces, &c., it is surprising at first to observe the difference in prices of articles from different works. Chimney-pieces, &c., sent over here direct from Belgium are, as a rule, much cheaper than those that can be bought from marble works of any standing in England; but the difference, as it appears to me, arises mainly from the less amount of labour bestowed upon the polishing. I have frequently known cases where chimney-pieces brought direct from Belgium have had to be polished again within two years, and the expense of this second polishing necessarily makes the article in the end very costly. Although I do not know the exact method of polishing adopted by the Belgians, it seems evident that they depend more upon a quick dry polish and chemical processes than the slow-laboured style of our English marble masons. The English plan is to grind and form the surface of the marble by means of wet friction, which is much slower than dry, and does not injure the marble, while dry rubbing does, by making it softer. This process is repeated with three or four different stones in order, and then the surface is glossed with lead and felt. This genuine English plan is superseded in some marble works, and doubtless in Belgium, by dry rubbing, a quick process, but one destroying the hard surface of the stone. The glossing operation is then performed, not by rubbing with lead and felt, but by pouring on the marble some such chemical as spirit of salt. This is so strong, that when passed upon the marble it produces a hissing sound, and must necessarily soften the surface. It then receives a slight rubbing, which soon occasions a polish; but this may be detected from the genuine English polish by a peculiar deadness. In course of a few years this polish disappears, and requires reviving. The true polish lasts for a generation, with ordinary care.

This chemical wash, but without the dry rubbing, is the English mode for polishing carved work; the ordinary rubbing would destroy the spirit of carved marble-work: it is therefore simply tooled, or, at other times, sanded, and then washed with spirit of salt: the consequence is, all English carved marble-work has rather a dead look, but this is not objectionable. It soils in the course of a year or two, but may be restored by a washing of American potash or chloride of lime. The Italian marbles, as they are called, most generally used in England, are the black and gold, the dove, Bardilla (which is like black and gold, but inferior); also the statuary, the vein, and the Sicilian. Lately the Irish marbles have been freely used in England. There are four sorts, red, green, black, and the fossil, a dark colour. Of the Belgian marbles, the St. Anne's must be classed among the best. The Belgian black is a very inferior article, and not equal to our common Derby black. All marbles are more or less rotten, that is, they are composed of so many parts that they have a tendency to come to pieces. The more beautifully they are marked, the more rotten they are. The various marks show the junctures or formations in the marble that produce this quality. For this reason, marble, if intended to be worked as a pillar, and to bear a weight, must be carefully erected; if out of the perpendicular, and supporting much weight, it is liable to snap at some of these formations. The black and gold marble, though one of the most beautiful, is one of the most rotten, and when polished is exceedingly susceptible to scratches and snips. The Italian dove and the Belgian St. Anne's are the most durable dark marbles. The Italian statuary, though a very beautiful marble, is soft. The vein and Sicilian are more durable, and will consequently resist dust better. The Irish marbles are equal to the Italian in quality; they are rather less expensive, on account of the cheapness of Irish labour.

Inferior marbles may be told by blotches and other faults, and by being soft they will not bear a fine angle. In less than a month after working inferior light-coloured marble-work will look black at the corners, which blackness cannot be wiped off. In good hard marble-work any such soiling will wipe off. Dark-coloured marbles are very rarely soft.

TIMBER.

With reference to the timbers used in this neighbourhood, spruce from St. John's or Quebec is good bearing timber, but when it does give it breaks clean; it snaps off very short. The fibre of the wood is short. Spruce curves and twists very much, and often the cracks we see in plaster ceilings are to be attributed to the twisting of the joists and spars, and are not the plasterer's fault. On the Eastern coast, Baltic timber has hitherto been used for the purposes for which we use spruce, and now, on account of increased facilities for importing Baltic timber, it is becoming more generally used in Liverpool. Baltic red pine is one of our best bearing timbers, and stands the weather well when used for outside purposes; its fibre is long, and it will bend rather than break quickly. Pitch pine, besides being most useful for finishings, is good for outside purposes, and stands the weather well, but occasionally the hot sun will bring out the resin, which runs down the wood, taking the paint with it: this makes it less desirable, on the whole, for outside purposes than red pine. Baltic white is a very nice wood, and looks well in floors; it is not so good for bearing purposes as the red; the knots in the white are often what are called pin knots, small and black; they dry and drop out. The knots in the red are larger, but sound. Baltic timber is often disfigured by a redundancy of knots: these do not militate against the wood, and often would not appear if the logs were cut up with judgment. A skilful workman can so cut through the knots that they do not show, simply by studying the way they run, and cutting through the feather of them.

Quebec is a superior yellow pine to that from St. John's; in the rough it is clearer, and when cut up is finer looking. If a piece of St. John's yellow pine be rubbed it will occasion a very fleecy surface; that from Quebec has less of this quality, and is often free from it altogether. Good St. John's and Quebec, however, cannot be distinguished by any but experienced judges.

The best Spanish mahogany to specify is that obtained from the city of St. Domingo; this is the most beautifully marked. That from the country of St. Domingo is an inferior sort. The bastard mahogany and the bay-wood are also inferior sorts. The bay-wood, of which we make such use, comes frem the Mexican coast.

In French-polishing mahogany, polishers, if not well watched, will often lay a ground of red lead, whiting and plaster of Paris, then polish on top of this: this makes the work easy, which is otherwise very laborious. It, however, hides a great deal of the ornamental figure, and the polish quickly disappears. If ever this process is detected, the best plan is to have the whole taken off with American potash, and start afresh. Fine polishing is accomplished only by means of laborious rubbing with the different French gums in their proper order, and gradually the whole figuring on the wood becomes developed.

A peculiarity of the poplar wood, that makes it suitable for special purposes, is, that it will not burn; it only smoulders.

In practical joiners' work a great difficulty with men is to get them to bore their work before nailing. I refer principally to framing, and fixing mouldings. It is a little more trouble to bore first, and if men are not constantly reminded, they will neglect this in good joiners' work as well as in common. If there is no bore made first, there is a great tendency for the nail to slip off the stile into the panel, and the result is, if the panel shrinks at all, it takes the moulding with it and leaves a slovenly finish.

Extra attention is becoming necessary to these particulars, for, according to appearances, it is probable the principal work for joiners will eventually be fitting, since all work may in course of time be made by machinery.

At present English machine-work is not of that finish that will admit of its being used universally, but most of the foreign work has a very fine finish, and there is no doubt English machinists will before long be able to equal if not surpass this, and then I cannot see what objection there will be to machine-work generally. At the present time the cost of machine-work is not reduced to what it might be: so much of the tree has to be cut up before a proper grain for machine-work is obtained that considerable waste results. When this difficulty is better understood, and the portions of the timber that cannot be adapted to machine-work more successfully utilised, then the cost will necessarily be reduced. The portions of the tree where the branches unite causing a cross grain interfere now with the successful working of the machines and occasion the waste.

Of those portions of joiners' work that cannot at any time be made cheaper by machinery, the rebated sashes are a good illustration. Although these are frequently made by the machine, the result is not satisfactory; being run in long lengths, they do not cut well for mortising, and there must be a considerable amount of piecing before they are completed: this makes them almost as costly as home-made work, and not so satisfactory.

IRONWORK.

Architects often specify the cold-blast iron, and do not get it. The same with the Low Moor iron.

The Low Moor iron from this country is the best wrought iron we can get; it is an extremely expensive material, being very hard to work; the expense per ton wrought is double the expense of iron wrought from Sheffield, Warrington, the Clyde, or any of the ordinary black countries. I do not think it wise to specify Low Moor in the ordinary way: instead of 24*l.* per ton we may be charged 50*l.*, and, after all, not get what we pay for. For most purposes ordinary iron will answer equally with Low Moor, if a little thicker material is used; but where small size is required, and great wearing power, of course Low Moor is best. In bolts, for instance, they do not wear much; if 1 in. of Low Moor iron will be strong enough, then make them of ordinary iron 1¼ in. thick. By specifying these you save the extra charge, besides avoiding the risk of having 1-in. bolts of ordinary iron put into the work, which might prove too weak. Low Moor iron is more malleable and tougher than the other; it has long fibres; the difficulty in severing it is the best means of testing it; its parts have to be literally dragged asunder. Cold-blast iron from the various depôts in Wales is the best class of cast iron; and as it is difficult to drag the Low Moor into pieces, so is it difficult to break this. I have myself broken ordinary pig with one blow from the hammer; but cold-blast iron will sometimes bear twenty blows from a smith without breaking. The difference between cold blast and ordinary cast iron is more easily seen than that between Low Moor and ordinary wrought iron. When cold blast is placed beside common iron it has a bright look, while the common has a dull, dead appearance. But as a rule it takes experienced men to detect these metals from the common iron: it is, therefore, well when they are required for special purposes to specify an amount for them, and take special means to get the work done.

IRONMONGERY.

The numerous qualities of ironmongery fittings necessitate the most careful attention on the part of the architect. As a rule, good class ironmongery may be told by its finish; if the finish of an article is workmanlike and satisfactory, it may generally be concluded that the hidden portion is good; but if there is a rough and uneven finish, a tendency to snip and get out of order, then it is well for the architect to pay attention to the hidden work, as the article is not likely to be first-class. Common sash-fasteners, having an effective appearance, often surprise the housecowner by breaking off when more than ordinary pressure is applied; an examination will usually show these to be of hollow metal instead of solid. If we specify solid articles, and see that we get them, we may be generally assured that the rest of the work is good. In order to secure good locks, bell-pulls, or door furniture, the best plan is to allow a price and arrange specially for the purchase of these articles. Handles coming off is a constant source of annoyance to housecowners, and they take for granted when this occurs the furniture must be jerry, whereas the best furniture is liable to this difficulty, and unless Pitt's or Walker's patents are used, I do not see how, with present appliances, the evil can be altogether avoided.

Bell-hanging is often a source of trouble to the architect. No. 16 copper wire is a good strength, but difference of opinion exists on this point. Fault is sometimes found with the putting two or three wires in one tube; this need be no drawback; the difficulty is when the tubes in which the wires are put are too small; a ⅞ in.

tube, or even a ¼ in. tube, will admit of three or four wires working satisfactorily. The cause of bells ceasing to ring properly a few months after the building of a house is often very excusable, though the circumstance in some minds stamps the work as bad. The bells having been put in while the materials of the house are in a green state, they are liable to rust, and in some localities more than in others. The iron portion of the crank rusts and loosens the wires. These, therefore, require a little attention when this occurs, which good bell-hangers are willing to give; indeed, it is well to require bell-hangers always to keep their work in order for six months.

GASFITTING.

A fruitful source of jumping in gas, when there are not the usual irregularities of defective workmanship, is the following:—¼ in. piping is fixed instead of ⅜ in. or wider: the consequence is, when the gas passes through the pipe of the kitchen or other warm apartments it becomes rarified; it then ascends to the colder apartments, and, through having been heated, is condensed into water; it then by its own weight falls down the pipe. If the pipe were wide enough, say ⅜ in. or ½ in., then the volume of water thus formed would, because of its own weight, have sufficient power to pass through the pipe to the proper syphon or meter, where it could be let off at will; but the pipe being only ¼ in., the volume of water thus formed has not sufficient weight to make its own way down the pipe, and the force of the gas coming up is sufficiently strong to show a balance of power, the gas pressing upwards and the water downwards proving in turn the stronger.

On account of this tendency in gas to become rarified in warm apartments, and the more easily condensed into water afterwards, a meter ought never to be placed in a kitchen or other such like place; the colder the apartment the better; the pipe ought never to be less than ⅜ in. for the reason named, and even this size without a good fall is liable to occasion jumping. All gas is liable to form into water, and as it passes through cold regions it invariably does so to some extent. For this reason large syphons are provided in the streets, and a great deal of water may be seen taken from them at times, being merely condensed gas. All gas is liable to freeze; on being made it passes through water; hence it is damp to begin with. Frozen gas need offer no serious difficulty, if the pipes are large enough, and have a good fall to a syphon. By the application of warmth it will melt into water, and then pass away.

LONDON CLUBS.

THE Cocked Hat Club, an institution founded as an adjunct to the Society of Antiquaries, and whose children only, as with the Society of Noviomagus, are qualified to become members, had their annual outing on Saturday last. The members present included Sir William Tite, M.P.; Mr. F. Ouvry, F.S.A.; Dr. Doran, F.S.A.; Mr. Henry Hill, F.S.A.; Mr. William Smith, F.S.A.; Mr. Durrant Cooper, F.S.A.; Mr. Crowdy, F.S.A.; Mr. A. White, F.S.A.; Dr. Diamond, F.S.A.; Mr. Talbot Bury, F.S.A.; Mr. W. J. Thoms, F.S.A.; and some others. They descended at Three Bridges Station, on the Brighton line, that they might see the Saxon Church at Worth, and were unanimous in the expression of their regret, to use a mild term, that old work had been so ruthlessly removed. The chancel has been rebuilt, and the curious old wooden steeple, formed with four large tree-trunks, cleared away. Some particularly interesting windows of rude character have been opened in the north and south wall of the nave, forming a clearstory; and the north and south doorways are seen to have been very lofty and narrow with semicircular heads. The windows are each of two lights, round-arched, separated by a stout rough shaft. They then visited the pretty village of West Hoathly (it should be *ley*, but the people of the locality stick to the "ly"), and the ancient parish church, passing on their way Selsfield Common, one of the loftiest spots in the neighbourhood, commanding charming views, and where anciently the beacon flamed in reply to others at Ditchling and Chanctonbury. A fine old stone house in the village, belonging to the end of the fifteenth century, is connected by popular tradition, if in no other way, with Anne of Cleves. The church, now in the hands of the restorer, and roofless, shows, in the north wall of the chancel outside, remnants of Norman work, and elsewhere of Early English. Two cast-iron gravestones (to use an Irishism) in front of the west door of the tower served to remind the club of the ancient iron-works of the county, which flourished till the middle of the last century, and led to large clearances of timber. It was remembered that the ponderous iron railing around St. Paul's was cast in Sussex (at Lamberhurst), and cost over 11,000*l.*; and all had seen some of the many chimney-backs and dogs still remaining in the neighbourhood. It was time now, however, for the real object of the day,—a visit to Rockhurst, the residence of Mr. Charles Hill, F.S.A., and its famous rocks and woods. Here they were joined by Mr. George Smith, of Paddockhurst, Dr. Jonson, and some others, and, being first photographed as a group in conjunction with the house, made their way to the remarkable range of sandstone rocks, of which the poised mass called "Great upon Little" in Andreds Wood is the most widely known. Of this Mr. Charles Hill gave a short account. Weighing some 300 and more tons, it rests on what looks in some positions a point, but is in truth a narrow ridge some few feet in length. The faces of the rock are covered with initials and dates, ranging, so far as discoverable, from about the year 1600: one century seems to have been scraped out by the next. Old men mention as amongst those visible not long ago, the initials of Pitt and Fox, the latter of whom, it will be remembered, lived at St. Ann's-hill, near Chertsey, in the adjoining county. The stone has been viewed as the emblem of the British deity Andrast, but on what ground we do not know. Suffice it for us to regard it as a remarkable product of nature, and to hope that it may be long before those influences which have brought about its present form and position may so much farther operate as to cause it to topple over into the valley at its foot, where already lie other huge masses detached from the range above. Sir William Tite, who is strong in geology, had—

"——Ample room and verge enough"

to discourse of early seas, earthquakes, upheaved strata, and channels scooped by rushing water, and used his vantage well. Afterwards the whole party were hospitably and most elegantly entertained at Rockhurst, and quite late in the evening came back rejoicing.

THE BUILDINGS FOR ANNUAL INTERNATIONAL EXHIBITIONS.

THE buildings in which the Exhibition of 1871 will be held have been designed by Lieut.-col. Scott, R.E., and are to be of a permanent character. Those persons familiar with the Horticultural Gardens know the long ornamental arcades parallel with the Albert and Exhibition roads. At the back of these arcades is a piece of waste ground, some 200 ft. wide, extending to the road. On these strips of land the two main exhibition buildings are to be built. At their northern ends, these main buildings will be placed in communication with the conservatory of the Horticultural Gardens, and through it with the new Albert Hall of Arts (the grand promenade of which will be utilized for exhibition purposes, the educational collection being placed therein) by covered approaches, which are being made upon the top of the arcades connecting them with the conservatory. The southern ends of the main buildings will communicate with the permanent portion of the Exhibition building of 1862, which forms the southern boundary of the Horticultural Gardens. This building is now used for the exhibition of objects in connexion with the South Kensington Museum. By this means, the building will completely surround the gardens, to which the public will be admitted at certain times, and under special conditions, which have yet to be decided upon. It is also proposed to connect this series of buildings with the South Kensington Museum, by means of a covered way under the Exhibition-road, and also in the same manner with the Metropolitan railway.

The length of the main buildings, on the ground floor at each side, will be 1,100 ft., on the upper floor at each side, 600 ft. Their width throughout will be 30 ft., and the height of the two floors, 60 ft. The level of such a length of building will be broken each side by four raised pavilions or dwarf towers; four of these, on either side of the north and south extremities, will be 35 ft. wide, the two centre ones being 65 ft.

The ground-floors of the buildings consist of a series of chambers, broken in equal lengths by the varying dimensions of the central portions, the light for which is obtained from large windows in the east and west sides of the respective buildings, but there can, of course, be no windows in the sides which adjoin and continue the present arcade walls.

The lower story will be set aside for the exhibition of woollen fabrics, manufactures, tools, and machinery. The upper floor will be a repetition, on a smaller scale, of the picture-gallery of the Exhibition of 1862; the galleries will have no side windows, but will be lighted with a single centre ridge glass roof. The floor will be fireproof, made on the Fox & Barret principle, of rolled iron girders filled in between with 10 in. of concrete, and tiled on the upper surface. Provision is made in the built girders for heating the buildings by means of hot-water pipes, and also for ventilation. These galleries, which are to be 30 ft. wide by 25 ft. high, will be used exclusively for the exhibition of works of art and art-manufactures, such as painting, bronzes, sculpture porcelain, decorative furniture, jewelry; in fact, every kind of artistic work, whether applied to objects of ornament or domestic use.

On the side of the Albert and Exhibition roads, the buildings will not be excessively decorated. In the front, overlooking the Horticultural Gardens, a greater endeavour in that respect will be made. The arcades of the Horticultural Gardens, which are only 12 ft. wide, are being finished, and their stone capitals and cornices are being carved from designs by the South Kensington art-students. The arcades, which are at present only temporarily covered, are being roofed over in a permanent manner, and will form a promenade on a level with the floor of the picture and art galleries of the upper saloons, with which they will communicate through wide doorway entrances. The side next the gardens will have a terra-cotta balustrade, from which rise light ornamental carved wood columns, supporting a trellis-work of iron running along the whole length and breadth of the walk. This trellis-work will be interwoven with vines and creepers. The balustrade will contain vases filled with flowers, and a view will be obtained over the whole extent of the gardens beneath.

The buildings are in the Decorated Italian style, with mouldings, cornices, and courses in buff-coloured terra-cotta; the brickwork being of the red Fareham bricks, so as to match the garden architecture, and harmonise with the new museum buildings which are rising in front of them. The buildings altogether will accommodate, it is stated, 50,000 people.

POSITION OF CATHEDRAL ORGANS.

THE proper settlement of this question is of so much importance that it is desirable all sides should be heard. We give place, therefore, to the following:—

Sir,—It appears from a published report on the restoration of the interior of Salisbury Cathedral, that Mr. G. G. Scott is advocating the dispersion of cathedral organs into various parts of the building, as one way of getting out of the difficulty of providing for musical, without interfering with architectural, effect. Mr. Scott admits, what in a recent article on the subject of church organs you strongly laid down, that the position on the choir screen is the best possible for the organ acoustically, as affording it free space to speak all round, without having its sounds in any direction driven disproportionately upon the ear by reflection from an adjoining wall. In opposition to the upholders of what he calls the "vista" theory, Mr. Scott is favourable to the choir-screen position for an organ of moderate size (in short, I suppose, for the old-fashioned English cathedral organ), but deprecates the great size to which the instrument has of late attained, "the inordinate growth of modern organs,"—a phrase which could only have been correct with regard to English organs, as there have been in German churches for nearly two centuries organs larger than any erected in our cathedrals, except the York organ before it was cut down. In view, however, of this deprecated "growth," he would leave only the small portions of the instrument (the choir organ?) on the screen, and "draft off all the cumbersome parts to the back of the stalls in the first arches (right and left) in the choir aisles, where they would be very much concealed; or possibly, if found practicable, into the triforium." He would leave the organist in his

accustomed seat in the "loft," but would introduce the electric movement, "which would obviate all inconvenience arising from the division of the organ into three sections."

Now, with regard to the musical effect of an organ, the scheme is not promising. It is of the greatest importance that the pipes composing an organ should be so massed together (without being crowded) that their sound should reach the ear simultaneously, and blend together as one instrument. They cannot do this if the pipes are distributed about in the manner proposed; and, moreover, the parts of the organ which it is proposed to place in the confined situations mentioned are just those which ought most of all to have plenty of space round them; if, as I understand, the major part of the "great organ" is to go off the choir screen, as well as the pedal pipes. With regard to those latter, the pedal diapason pipes may be placed on the floor with advantage in one respect, as these are not noisy, but only sonorous, and gain in resonance by being near the floor, though their effect sounding on each side of the listener alternately would not be good. But nearly every large organ now includes (and every one ought to include) in its pedal organ one or more powerful stops of the "reed" class, which are among the largest pipes in the instrument, and which, from their loud and harsh *timbre*, especially need to be placed away from very close contiguity to listeners, and to be as unconfined as possible with regard to sounding space. So much is this the case, that I have known a distinguished professional organist refuse to sanction the introduction of a pedal *trombone* stop into an organ which he was superintending, and which was to be erected in one of the now usual "organ-chambers," on the ground that "there was no space for it to sound, and it would only be a nuisance." If the people of Salisbury are content to have their instrument so dismembered it is of course more their business than mine; but they should think twice before they assent: and at all events this mode of treatment ought not to be made a precedent in dealing with cathedral organs. I understand that it has been already suggested for another cathedral which is being restored under the same direction. The system proposed would have all the drawbacks, which you have before commented upon, of the confined organ-chamber, together with the additional defect of widely separating portions of the instrument which have to be heard together, and ought to have a homogeneous effect. My attention has been called to the recommendations in the report on Salisbury Cathedral, by a cathedral organist of long experience, who completely and unreservedly deprecated such a scheme; and Mr. Scott may be assured that on this head he will have the musicians against him to a man, or, at all events, to

AN ORGANIST.

[Our correspondent knows something of the matter on which he writes, and we allow him to be heard, but we by no means desire to pronounce at once against the architect's proposition: the success or otherwise would depend entirely on the way in which it was carried out. We know a church where the organ has been divided and placed on each side of the choir (in the first archway north and south at the west end of it), the communication being effected through a tunnel under the pavement of the chancel, and the result, so far as sound is concerned, is satisfactory in the extreme. It has the effect, however, of blocking up the chancel arches and, partially, the aisles, and certainly does not commend itself in that respect.—ED.]

PROPOSED ADDITIONS AT THE PARLIAMENT HOUSES.

SINCE we called the attention of our readers to the proposed alterations and additions for new refreshment-rooms, the Select Committee of the House of Lords has reported upon them. We subjoin a copy of their report, which notices several of the points to which we referred. The remarks of their lordships on the manner in which the work should be carried out, and on the risk of disfiguring the building, for want of a proper design, will commend themselves to all; and we cannot too strongly urge their importance on the Government and the public. The report is limited to that part of the proposal which affects the accommodation of the House of Lords:—

"That the committee have again met, and have been again attended by the Clerk of the Parliaments.

The committee have considered the report of the committee of the House of Commons, of the 25th May last, referred to them by order of the House, in which that Committee states, that they have considered the last report of this committee, and inform the House that this committee had advised their lordships to give up the Painted Chamber to the exclusive use of the Commons, in the event of the plans recommended by this Committee being agreed to.

It will be recollected that the House of Lords had, through this committee, expressed their readiness to give up their best committee-room, to meet the convenience of the Commons. In the report of the Commons committee it is stated 'that they abstain from entering into any inquiry respecting the arrangements of the House of Lords, as they consider such arrangements should be made by their lordships directly with Her Majesty's Government.' The committee therefore consider it necessary to recommend that steps should be taken by the House to secure an assurance from Her Majesty's Government that the conditions on which they have advised that the Painted Chamber should be given up to the Commons shall be fulfilled, as without such assurance they cannot advise that the concession in relation to that apartment, which has always belonged exclusively to the House of Lords, shall be made.

The committee hope that a competent architect may be employed to prepare the plans for the new room proposed to be given in exchange for the Painted Chamber, and for the approach to it from the landing-place on the staircase in the lower hall. As some alteration must be made in the window there, care should be taken that it is done in a manner consistent with architectural effect. They are confident that the House would be unwilling that, for want of a proper design, the building should be in any way disfigured, in carrying out their proposals.

Having examined the plans appended to the report of the Commons committee, they find that the kitchen therein designed will be only 14 ft. 9 in. wide, and, as they are informed, only 12 ft. 8 in. high. In the plans prepared by Mr. Barry, the kitchen was to have been placed under the new room to be erected for the House of Lords. By this, or some similar plan, very superior accommodation in space and height would be obtained, together with a more convenient situation for the joint service of the two Houses from the same establishment, should such an arrangement at any time prove desirable.

The committee have been informed that the difference in the estimate for this portion of the work between Mr. Barry's plan and that of the First Commissioner is not large; and the committee desire to repeat the remark made by them in their former report, that while 'they are very sensible of the importance of observing reasonable economy in all public expenditure, they feel that in making any permanent provision for the accommodation of the Houses of Parliament it is desirable that all should be done in the best manner, and that some additional outlay, by which greater convenience will be obtained, will be money well laid out.'

The plans laid before this committee by Mr. Barry last year, so far as they relate to the kitchen department and the new room, are appended to this report."

THE DONCASTER NEW CORN EXCHANGE AND MARKET IMPROVEMENTS.

A SHORT time ago the Corporation of Doncaster caused to be completed a new cattle-market and public slaughter-houses, which will compare favourably with those in any town in Yorkshire. The cattle-market is laid out with taste, while the slaughter-houses and the conveniences connected therewith leave little to be desired. These provisions are about to be followed by the erection of a new corn exchange and an additional wing to the present market-hall, to be used as a vegetable-market. The contracts for this work have just been opened. The work is divided into two parts. The first contract, A, includes the erection of a corn exchange, 91 ft. by 87 ft., and a vegetable-market, 64 ft. by 64 ft., having frontages of 300 ft. by 40 ft. in height. The buildings, so far as the stone-work is concerned, are to be of ashlar. The tenders for the mason's and other works were found to be of a very formidable character, no fewer than twenty-seven of the leading firms competing for the work. The amounts varied very much, the difference between the highest and lowest tender being considerably over 5,000*l*. The highest was sent by Messrs. Simpson & Malone, of Hull, the amount being 16,927*l*., and the lowest by Messrs. Weatherley & Rymer, of York, viz., 11,005*l*. Not fewer than five Bradford firms were amongst the competitors. The market committee, who had the management of the tenders, accepted that sent in by Mr. J. Athron, of Doncaster, the amount being 11,172*l*. The tenders relating to Contract B were also opened at the same time. The contract consisted of the roof of the Corn Exchange, including eight semicircular lattice-ribs, 60 ft. in diameter, and the T iron ordinary king-trusses for the vegetable-market roof, cast-iron columns, girders, and other works therewith. As in the first contract, the tenders were very numerous, not fewer than twenty-five of the leading Yorkshire and London firms competing for the order. Amongst the competitors were Messrs. Westwood & Bailey, London Engineering Company, Isle of Dogs, whose tender amounted to 3,200*l*. 3s., being the highest sent in. Messrs. Kirk & Parry, Westminster, sent in the tender No. 7 in amount on the list. The committee, as in the other case, accepted the lowest tender but one, which, in this instance, was sent in by Messrs. R. & J. Rankin, of Liverpool, the amount being 2,096*l*. The total amount of the two highest tenders was 20,187*l*. 3s., whilst the two lowest amounted to 12,955*l*. The total amount of the two tenders accepted was 13,268*l*.

SCHOOLS OF ART.

A School for Winchester.—A meeting of a highly-influential character has been held, Mr. J. Bonham Carter in the chair, for the purpose of considering the propriety of establishing a School of Art for Winchester. Mr. Buckmaster, of the Science and Art Department, explained what the department did to foster a love for art. It did not seek to make painters or sculptors, but to raise the standard of taste. The Mayor, Mr. R. Underwood, moved a resolution, which insisted on the desirability of establishing a School of Art, and read a list of names, commencing with Lord Carnarvon, Lord Eversley, Lord Northbrook, the county and city members, and other highly influential men, who had promised their patronage.—The Archdeacon of Winchester seconded the resolution, which was agreed to unanimously. The appointment of a committee was also voted, and subscriptions were invited, to provide a proper building (which Mr. Buckmaster said the department would assist to the extent of 2*s*. 6d. per cubic yard).

The Cambridge School. — On Thursday, the 23rd ult., the students went to Angelsea Abbey, for a sketching excursion. The party (of nearly forty) left Cambridge at a little after 10 a.m., and on arrival soon settled down in different parts of the grounds to sketch the interesting old house. Several very fair sketches, in colour as well as pencil, were made.

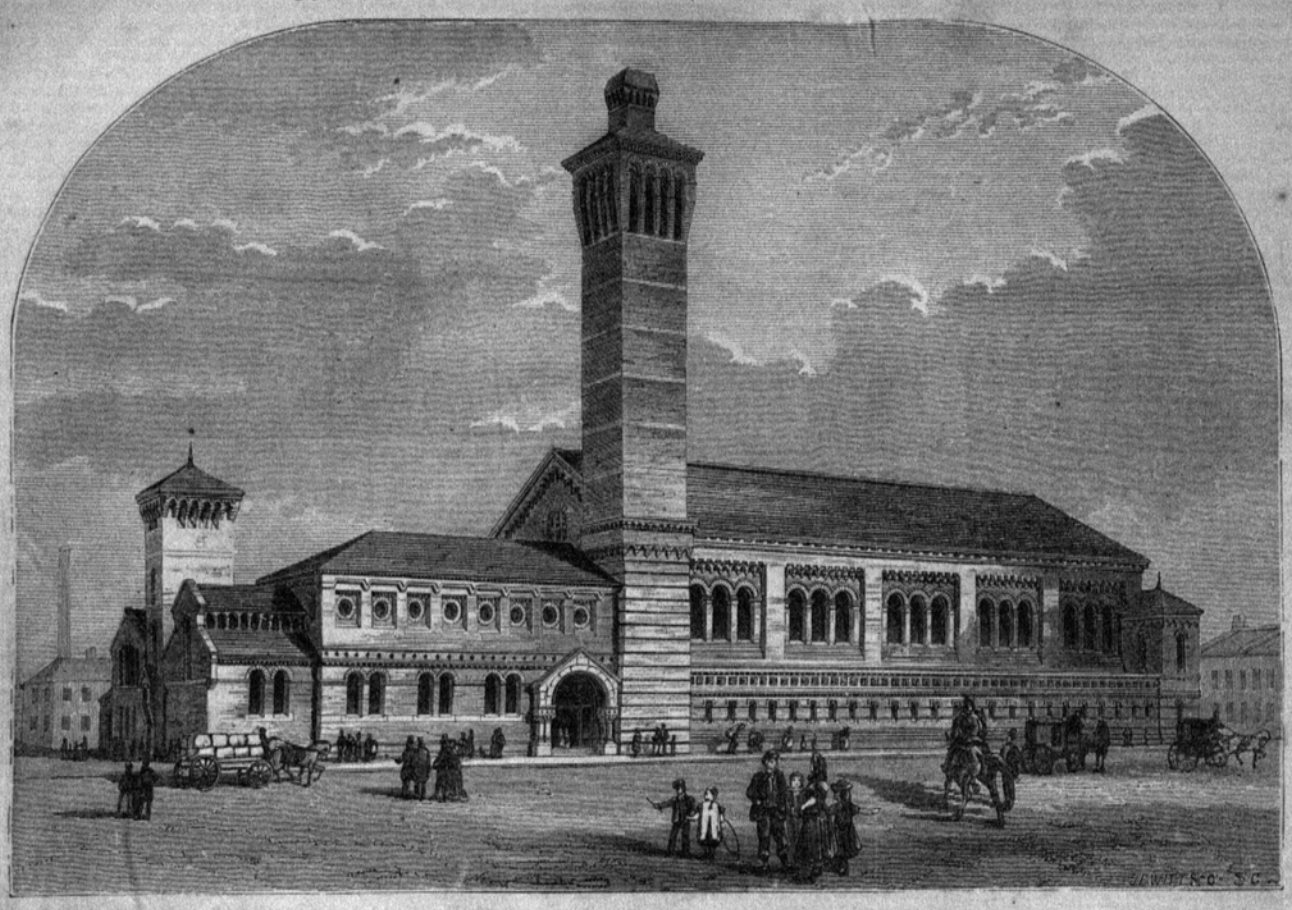
A PROFESSIONAL GATHERING.

ON Wednesday last Sir Digby Wyatt entertained at dinner a number of the members of the Royal Institute of British Architects invited to meet the new President, Mr. T. H. Wyatt, including Professor Donaldson, Professor G. G. Scott, Mr. Pennethorne, Mr. B. Ferrey, Mr. C. C. Nelson, Mr. G. E. Street, Mr. F. Marrable, Mr. P. C. Hardwick, Mr. Godwin, Mr. I'Anson, Mr. Penrose, Mr. E. Christian, Mr. E. M. Barry, Mr. Horace Jones, Mr. Owen Jones, Mr. David Mocatta, and Dr. James Fergusson. In reply to the only one toast given, "Prosperity to the Institute," the President, in a few well-chosen sentences, expressed his desire to maintain its dignity, and that of the profession generally. Professor Donaldson alluded to the meeting about to be held with a view to the completion internally of St. Paul's, as a matter interesting to architects; and Mr. Penrose, on the part of the Dean and Chapter, bespoke the good offices of all there.

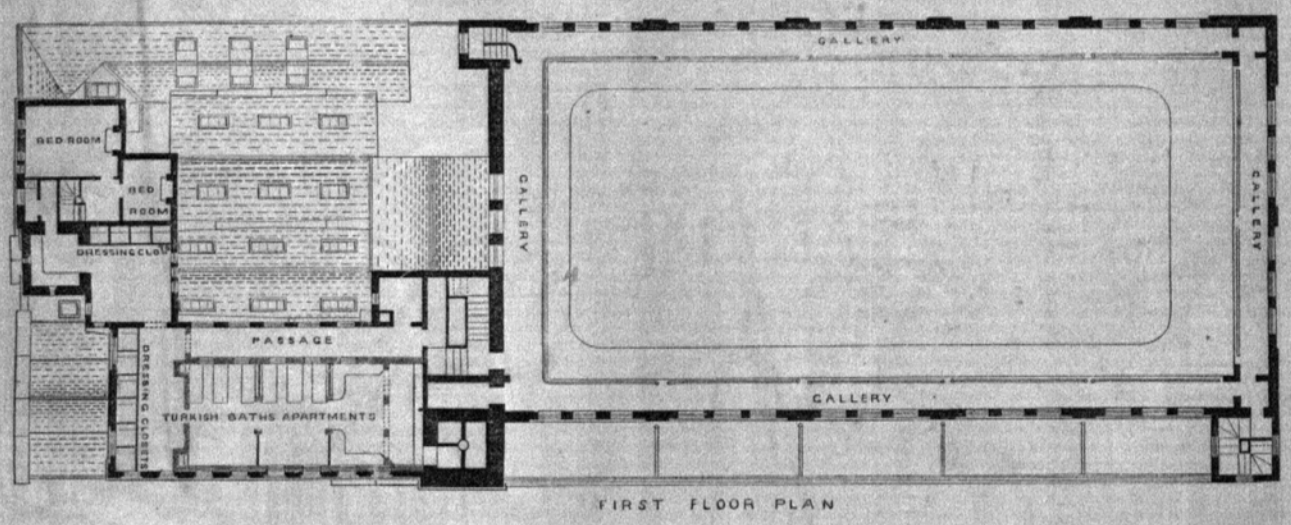
CORPORATION BATHS, ASHTON-UNDER-LYNE, LANCASHIRE.

ILLUSTRATIONS are given in our present issue of the Baths now in course of erection for the Corporation of Ashton-under-Lyne, from the designs of Messrs. Paull & Robinson, architects. The covered bath, it will be seen, is of very considerable size. Around it is a gallery. During the winter months it is proposed to floor over the space otherwise occupied by water, and convert the interior into a gymnasium. The remaining one-third of the area of the site is occupied as follows, namely: a plunge-bath for females, having a water area of 25 ft. by 18 ft., where the lasses of Ashton may learn to swim; six first-class and thirteen second-class private baths, so arranged as to be accessible for men and women, as may be required; a dwelling-house for the manager or curator in charge of the premises; and a complete set of Turkish baths. The last-named are placed in a story above the ground floor, and flank the ventilating shaft next Henry-square, thus giving height and importance to the principal façade. The women's plunge-bath will be furnished with two sets of dressing-boxes, on the same principle as the great swimming-bath. It is also arranged for access from the principal entrance, in Henry-square, as well as from the women's entrance, in Portland-street, so that when the latter bath is used as a gymnasium in winter, the smaller bath may be used for men also. It only remains for us to state that the style of the building is Romanesque, and that the exterior is of brickwork throughout, stone being introduced only where absolutely necessary for constructive purposes.

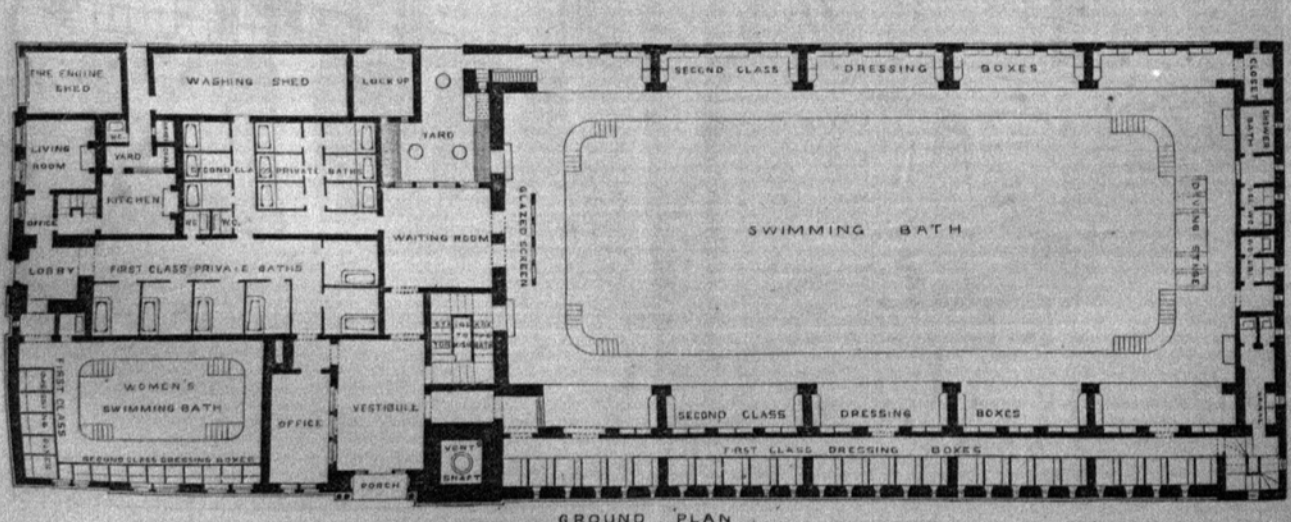
CORPORATION PUBLIC BATHS, ASHTON-UNDER-LYNE.



EXTERIOR VIEW.



FIRST FLOOR PLAN



GROUND PLAN

SCALE OF FEET

CORPORATION PUBLIC BATHS, ASHTON-UNDER-LYNE.——MESSRS. PAULL & ROBINSON, ARCHITECTS.

THE SEWAGE QUESTION.

Newent.—An order has been received from the Home Secretary, directing that in three weeks from the date of the order, a meeting shall be called at Newent, and a committee formed there, to carry out the Sewerage Act, and that the work must be begun in six weeks from the date of the meeting. If the committee is not formed the Government will send down an inspector, who will employ men to begin the work at the time named. There are great complaints that the area upon which the rate will fall, as laid down by Mr. Arnold Taylor, is not extended enough, especially in some directions.

The Treatment of Liquid Sewage.—An occasional summary of what is being done is useful. At fifteen of the places which are sewered wholly or partially, the liquid sewage is subjected to treatment, either by allowing it to remain for a time in settling-tanks, from which the deposit is occasionally removed, as at Burton-on-Trent, Birmingham, Epsom, Fareham, and Andover; or by filtering, as at Uxbridge and Ealing. In eight instances, deodorising materials are added to the sewage. Lime and carbolic acid are used at Carlisle and Harrow; lime alone is used at Leicester; lime and chloride of lime at Luton; perchloride of iron at Cheltenham; perchloride of iron and lime at Northampton; ferruginous clay treated with sulphuric acid at Stroud; and at Leamington, the lime treatment has lately been superseded by the method proposed by Messrs. Sillar & Wigner. By this treatment the sewage is clarified, and a deposit is separated which is sold as manure. In regard to the effects thus produced, it is stated that at Leicester the sewage runs off as pure as ordinary rain-water; at Ealing, it is said to be free from smell, colourless, and harmless to vegetable or animal life; at Stroud and Luton the effect is stated to be satisfactory; at Harrow the nuisance is said to be somewhat mitigated; and at Abergavenny the stench is said to be abated, by the treatment of the sewage. At Bury St. Edmunds, upward filtration through charcoal and gypsum has been abandoned, as too costly, in favour of irrigation. At Banbury, treatment of the sewage has failed, and irrigation is now resorted to; at Hereford, where it was proposed to be adopted in the Parliamentary plans, it has not been tried, on the score of expense; at Tonbridge it is about to be tried; and at Hastings and Cambridge experiments are being made. The cost of treatment amounts to 1,200*l.* a year at Leicester, for a population of 89,000, discharging into the sewers; at Ealing, with a population of 7,500, the annual cost is 300*l.*, and the cost of the plant for the purpose was 3,000*l.*; at Luton, with a population of 18,000 the annual cost is 500*l.*; at Cheltenham, with a population of 36,000, it is 350*l.*; at Uxbridge, with 7,000 population, it is 200*l.*; and at Alton, with 3,300 population, it is 46*l.* The solid deposit obtained by treating liquid sewage is sold at prices varying from 6d. to 2s. 6d. per ton. At Leicester as much as 5,000 tons is produced. At Luton, the deposit is mixed with night-soil; at Banbury, with street-sweepings; and at Stroud it is made the basis of a manure that is said to be sold at 7*l.* 10s. per ton.

FREE LIBRARIES IN LONDON.

SIR,—I have read with great interest the excellent letter of your correspondent "Jack Plane," on the necessity of free libraries in London.

If, as he says, ratepayers will not, as yet, submit to compulsory enlightenment, as represented by a free library rate, is it not possible that well-directed voluntaries might commence the task, and leave a converted Bumbledom to complete it?

Some months since, it was suggested by the Workmen's Club and Institute Union, 150, Strand, where, if I mistake not your correspondent, "Jack Plane," is well known and appreciated, that a free library, in conjunction with a a workmen's hall, might be established as a fitting memorial of Lord Brougham. Whether or no the times are ripe for a proper recognition of Lord Brougham's services, I cannot say; but, as yet, the response to the proposal of the Working Men's Club Union has been but small. During the last few weeks, however, we have suffered a loss which, as it affects popular literature, is perhaps even greater than that of Lord Brougham, who died in a ripe old age, when his work was done. I need hardly say, I allude to the loss of Charles Dickens. Would not a free library as a monument to Charles Dickens be a more noble memorial than all the statues or obelisks that the admiration of his countless readers may suggest? I now only make the general suggestion; but I feel certain that others, with larger leisure than myself would soon be found to organise the work and carry out the details, if, as I believe would be the case, the public mind responds to the suggestion.

Only last Friday evening, the manager of a small but thoroughly self-supporting workmen's club, in a densely-populated part of London, said to me, in speaking of the slender library now at the command of its members, "If we could get a set of Dickens's, we should double our number in a month." With half a dozen free libraries in the various districts of the metropolis, the good and gracious creations of Dickens's genius would be as familiar as his name now is to the masses of the people. Let the Dickens Free Library be started at once.

ALSAGER HAY HILL.

TO WHOM ARE WE TO LOOK FOR PAYMENT?

SIR,—An architect calls on a manufacturer, and orders some work, and names the builder who is to send sizes and measurements, and the builder sends his cart for the work when done, and the manufacturer books the work to the architect, as he had not given up the name of his principal. On applying for payment to the architect, the manufacturer is put off with the name of the builder. The principal then writes to the manufacturer, advising him to get his money from the builder, and speaks of the architect as having been employed by him.

Is not the principal liable to pay for the work, or is the manufacturer to look to the builder only, of whom he may have no knowledge?

P. & SONS.

*** The architect would, doubtless, be liable, unless he made his position clear at the time; and he would have his remedy as against the person for whom he acted.

DRINKING FOUNTAINS AND CATTLE TROUGHS.

THE eleventh annual meeting of the Metropolitan Drinking-fountain and Cattle-trough Association was held on Saturday afternoon last. The report showed that the society have now 130 fountains and 132 troughs under their care; that the consumption of water at some of the larger troughs amounts to between 2,000 and 3,000 gallons a day; that in some instances a single trough thus involves a cost of from 20*l.* to 30*l.* a year, and that in one parish alone the water company's accounts against the society, for 1869, exceeded 200*l.* It is to the erection of new troughs and to the efficient working of troughs and fountains already erected that the general contributions of the society are now exclusively devoted, the erection of new drinking-fountains for the people being commended to the philanthropy and public spirit of private individuals. The ordinary donations to the society for the year have amounted to 1,645*l.*, the donations for special fountains and troughs to 194*l.*, and the annual subscriptions to 881*l.* Mr. Smithies, in seconding the adoption of the report, expressed a hope that the committee would persevere in their exertions for the restoration of the Snow-hill fountain, at the corner of St. Sepulchre's Church. It was the gift of Mr. Samuel Gurney, and much historical interest attached to it as being the first fountain ever erected in London, but it had been taken down in consequence of the alterations in connexion with the Holborn Viaduct. Mr. Gurney, the chairman, announced that a lady had forwarded 1,000*l.*, this being the third sum of 1,000*l.* which the society had received from the same anonymous donor.

BRIBING A CLERK OF WORKS.

AT the usual meeting of the Metropolitan Board of Works on the 24th ult., it was stated in one of the reports presented by Mr. Bazalgette, the chief engineer, that two of the contractors executing works for a company, but over which this Board had supervision and control, had paid to one of the clerks of works employed by the Board to see that the work was properly done, the sum of 5*l.*, to induce him, it was supposed, to neglect his duty. This man, however, instead of doing so, reported it to his superior officer, the chief engineer, Mr. Bazalgette, who now reported it to the Board. Several members expressed their approbation of what the clerk of the works had done, and it was agreed that the names of the two contractors, with the letter they sent to the clerk of the works enclosing the 5*l.* note, should be printed in the minutes, and sent to all the vestries and district boards in the usual manner,—a scarecrow.

OPENING OF KEBLE COLLEGE, OXFORD.

THE closing event of the commemoration week at Oxford was the opening of the new college erected to the memory of the Rev. John Keble, author of "The Christian Year," who died about four years ago. The last occasion on which a new college was added to the University was in 1714. It is intended that Keble College shall offer a religious education on Church of England principles to a class of men who are now shut out from the complete advantages of university training by the high charges made in other collegiate foundations. The want of such an institution was often expressed by Mr. Keble himself. About 44,000*l.* have been already contributed, leaving a deficiency of 6,000*l.* The building, capable of accommodating 100 undergraduates and an adequate staff of tutors, is now complete, with the exception of the hall and chapel, which are only temporary erections. The college will be open for the reception of a few students in October of this year.

DISTRICT SURVEYORS' FEES.

TUBB *v.* GOOD.

SIR,—As this case when before the magistrate was reported in your journal, we think that a report of the judgment of the Court of Queen's Bench, reversing his decision, will be of service to your readers.

The point raised by the case was upon the construction of the 51st section of the Metropolitan Building Act, 1855, which states that the district surveyor shall be entitled to receive the amount of his fees from (among other persons) "the owner" of the building erected, or in respect of which the work or service has been by him done or performed; and the question for decision was whether the district surveyor was entitled to recover his fees from an owner of the building who became owner thereof *after the fees had become due.*

The Court of Queen's Bench has unanimously decided that the word "owner" refers to the person who was owner within the meaning of the Act at the time when the fees became due, and that subsequent owners are not liable to pay the same.

APPLEBY, WRIGHT, & CROWTHER.

DRAINING WITHOUT SCIENCE.

SIR,—"M. U." is wrong in attributing the depletion of our great water-basins, or the barren appearance of our fields, to *draining without science*, &c. My own experience assures me that drained lands retain considerably more moisture than undrained, by the water being distributed more equally throughout the under-surface, beneath the drains, and beyond the influence of evaporation. Not only do the rains descend, as our friend poetically remarks, to be kissed and embraced, but the loving earth reciprocates and faithfully retains the gushing shower, till there is a little too much of it, and even *then* does not part with it *too* readily. Floods, it strikes me, are more frequent in countries where subsoil drainage is not attended to, non-paying, or impracticable, such as thin, hot soils, moor, or mountain. An exceptionally dry season or two not being sufficient to keep up the supply from the great absorbing surfaces to the reservoirs in the basins below, whilst a constantly increasing demand is made on these for the use of an ever-increasing population in our great cities, keeping the huge steam-pump ever going to provide pure water for mankind; and numberless steam-horses employed in every branch of trade and manufacture, *may* perhaps account for the want of this great element,—certainly not the drainage of bog and swamp, whose *impervious* bottom only retains just sufficient water in dry seasons to fill the land with pestilence and death. The drainage of a city, un-utilized, is a frightful waste and a national evil; the drainage of the land is, on the contrary, a national benefit.

A CLOD.

WATER SUPPLY.

THE Maidstone Waterworks Company have for some time been sinking a well at their works at East Farleigh, and the result is a success. After sinking 400 ft., a boring was made for 193 feet further, and, after passing through the Wealden clay, a stratum of sand was entered, in which so plentiful a spring of water was found that the well was soon filled nearly to the surface, and several feet above the level of the river. Whether the supply will be permanent remains, of course, to be tested by boring still deeper, which we understand will be done, and the quality of the water has equally to be proved; but the indications at present are that, both in point of quantity and quality, the new supply will fully meet the public requirements. The result has also some scientific value, of which geologists will, doubtless, know how to avail themselves.

Professor Runge has made observations on the purification of water, which offer some interesting points. His conclusion is, that metallic iron offers the readiest and simplest means of disinfecting water, and of preserving it fresh. Thames water taken to sea in iron tanks soon becomes perfectly sweet, and remains so through a long voyage. A small piece of sheet iron or some nails placed in the water in which cut flowers are put will keep the water sweet and the flowers fresh for a long time. He also put some iron filings in a vessel with a very small quantity of water, and placed a leech therein, and found the water quite fresh and the leech healthy after six months had passed.

COMPLETION OF THE LOW-WATER PIER AT CARDIFF.

THE completion of this pier is looked upon as an important event at Cardiff. The first pile was driven in August, 1867, and the last in August, 1868. The work is now finished, and the pier will very shortly be opened. In the first twelve months forty-eight rows of Memel piles were driven in, there being six piles in every row, and the rows are 24 ft. apart. Each pile was driven down about 40 ft. below the surface of the mud, where it found solid resting-place in the gravel substratum, or in firm ground of some other nature. The pier is constructed throughout of timber, in bays of 25 ft. for two-thirds of the distance, and 16 ft. for the remainder, and two rows of continuous wrought-iron girders run down the centre of the pier from end to end. It is 1,350 ft. in length, and 34 ft. 6 in. in width, except at the end, where it is widened to 100 ft. Here, at the end, to give it additional strength, and to preserve the main piles from injury by vessels, fender piles of elm have been driven in. In the construction of the pier alone, exclusive of the station and waiting-rooms, 150,000 cubic feet of timber have been used. The pier is approached from the East Dock by a carriage road running over an embankment behind the coffer-dam, which closes the entrance to the old Tidal Habour. It is approached also by railways. The roadway is of planks resting upon the piles, and is protected by a wooden railing. A covered railway station is built above the pontoon. This station is 108 ft. in length, and 20 ft. in height. Throughout its length runs a platform raised to a level with the carriage steps. A light tower some 40 ft. high is surmounted by a dioptric light, around which runs a gallery.

The whole of the work has been carried out by the trustees of the Marquis of Bute, and from the designs of Mr. J. McConnochie, C.E.

NEW MUSEUM OF COMPARATIVE ANATOMY, CAMBRIDGE.

THE New Museums and Lecture Rooms Syndicate have reported to the Senate on the subject of the roof of the New Museum of Comparative Anatomy as follows:—

"Almost immediately upon the completion of the building in the year 1865, the roof was found to be defective. The attention of Mr. Salvin was at once called to the matter, and he was requested to come to Cambridge for the purpose of inspecting and reporting upon it. Mr. Salvin accordingly came, and stated that Messrs. G. Smith & Co., the contractors, would remedy the defect without expense to the University. In accordance with his recommendation, in the spring of 1866 certain tie-rods were added to the principals, and it was asserted that the mischief was remedied. This was, however, far from being the case. Early in the year 1869 the superintendent of the museum pointed out to the Syndicate a number of very serious defects. The roof was then examined by Mr. Goddard, architect, of Lincoln, and by Mr. A. J. Gray, the builder, of Cambridge, and the defects traced to the original defective construction of the roof, the condition of which at that time (June, 1869) was described to the Syndicate in the following terms:—

'The elliptic longitudinal arches are too weak at the crown to support the incumbent weight, and the iron tie-rods put in by Mr. Salvin after the completion of the building wholly fail to remedy the original defect; the roof is, in consequence, bent into hollows between the supporting wooden pillars, the windows are displaced, and the water in the gutters unable to find its way into the downright pipes.' The Syndicate were further informed that, 'through an original defect in the construction, which was not remedied by Mr. Salvin's subsequent application of iron tie-rods across the building, the supporting wooden pillars, as well as the external walls, were thrust out of the perpendicular,' and that, 'from the above-mentioned causes the roof had become separated from the end walls, and was already in some places more than half an inch from them.'

The Syndicate at once laid the information which they had received before Mr. Salvin, with a request that he would give his early attention to the subject, which he promised to do. Nothing more having been heard from Mr. Salvin in October, 1869, when the Syndicate first met after the long vacation, the Syndicate again addressed him, and it was ultimately (November, 1869) agreed between him and the Syndicate that the building should be examined by two practical persons, one appointed by Mr. Salvin and the other by the Syndicate. Mr. Salvin appointed Mr. Bromwich, builder, of Rugby; the Syndicate, Mr. Arthur John Gray, builder, of Cambridge. It does not appear that there has ever been any question between the two referees respecting the defects of the building, but they have not been able to agree upon the proper mode of making them good, Mr. Bromwich proposing a plan in accordance with which he maintains that all defects may be made good for an outlay of 115*l.*, Mr. Gray contending that the plan proposed would not remedy the original errors of construction, but would leave the roof still insecure. The plan which Mr. Gray suggests, as the least expensive that he can devise with the full assurance of its being effectual, will require an outlay of 350*l.* In the end Mr. Bromwich has, on behalf of Mr. Salvin, offered the following alternative,—viz., either to put the building into proper repair in accordance with the plan which he had proposed, or, if the Syndicate preferred some other plan, to pay the sum of 135*l.* in satisfaction of all claims upon Mr. Salvin. The Syndicate, having examined both Mr. Bromwich's plan and that of Mr. Gray with great care, have come to the conclusion that Mr. Gray's objections to Mr. Bromwich's plan are sound, and that they could not safely recommend it to the Senate. On the other hand, they are decidedly of opinion that Mr. Gray's is a satisfactory plan, and the best which can be adopted under the circumstances, and they recommend that his estimate and specifications be accepted, the balance of the expense being charged to the New Museums and Lecture Rooms Building Fund. And although they cannot regard the offer of 135*l.* made by Mr. Bromwich on behalf of Mr. Salvin as a proper or adequate offer, yet, having regard to all the circumstances of the case, they recommend that it be accepted."

REMOVAL OF WHITEWASH.

SIR,—Can any of your readers give information of a sure and economical mode of removing old whitewash from the exterior walling of a brick church now being restored?

E. K.

A READY-MADE IMPROVEMENT.

COVENTRY-STREET AND OXFORD-STREET.

To utilise the existing lines of streets now closed against traffic, which is struggling in all directions to get the nearest way to various points, is at once the simplest and cheapest, as well as the quickest, way of giving relief to this over-crowded city; and we are glad to observe that there is one vestry, at least, which is alive to the importance of brisk and ready action, when opportunity occurs.

It seems that very favourable circumstances now exist, whereby a direct route from the centre of Oxford-street to Coventry-street can be opened almost immediately; and "the Crown," for once, is ready to assist, and actually promotes, this public improvement. Between Berwick-street (which is in a line with Wells-street, on the north side of Oxford-street) and Rupert-street is a block to remove which would, in itself, be a boon, but which, if removed, would open up the route indicated above. Quite lately a fire occurred, which has reduced the difficulties originally existing, by destroying one side of a court, that would have been required to have been set back; and it only remains to set back the side of one court (Walker's-court), and remove one house, to have the line complete. The following quotations from a statement made by the worthy and energetic clergyman of the Church of St. Luke, situated in the midst of the district, will show that the matter was under consideration as long ago as 1863, when—

"An attempt was made to effect the improvement indicated. The matter was brought before the vestry, by a very influential deputation, headed by the present Lord Derby. The result was the rejection of the scheme by a very narrow majority. . . . .

At the present moment the difficulty is somewhat diminished by the destruction, by fire, of three of the houses in Crown-court, which stood in the way of the improvement.

As to the expense, I believe I am justified in thinking that you would now find the terms offered by the Metropolitan Board of Works more favourable than they were seven years ago; while all the arguments hitherto used to show that the parish would find a fair return for its outlay in the diminution of poor and police rates are as strong as, or stronger than ever. I have already referred to the liberal offer of the representatives of the Crown property which stands in the way; and the interest of the Woods and Forests in it is offered for the nominal sum of 1*l.*, so convinced are the owners that the junction of Berwick-street and Rupert-street would enhance the value of the neighbouring property."

We must congratulate the west end of London on the action already taken by the St. James's vestry, where the subject is under serious consideration.

THE VOLUNTARY ARCHITECTURAL EXAMINATION.

IT has been announced that six candidates presented themselves at the Institute of Architects for examination this year in the Class of Proficiency, and that of those gentlemen, the four following passed:—

Thomas E. Mundy, Park-lane, Tottenham; William Scott, 22, Horsemarket, Northampton; Walter L. Spiers, 21, Bernard-street, Russell-square; John S. Quilter (Associate), 9, Conduit-street;

and that in the preliminary examination, established this year, four candidates had come up for examination, of whom the three following passed:—

Joseph B. Cohen, 15, St. John's-terrace, Regent's Park; Thomas Garratt, Priory Cottage, Northampton; Thomas J. Street, Manor House, Sutton, Guildford.

In conformity with the present regulations of the examination, certificates will shortly be issued to all candidates who have passed in the respective classes of proficiency and distinction.

THE PLYMOUTH TOWN-HALL TENDERS.

AT a special meeting of the Plymouth Town Council, to consider a report from the Guildhall Committee of the tenders received by them for the erection of a new Guildhall and Public Buildings, the following tenders were presented:—

	For the entire Buildings.	Reduced Buildings.
Hunt & Seacombe, Exeter	£57,506	47,000
Shaddock, Saltash	44,900	36,400
Blatchford, Tavistock	38,464	31,785
Clarke, Plymouth	37,189	30,778
Clark, Bath	35,445	29,168
Harvey, Plymouth	33,997	28,111
Finch, Plymouth	33,687	27,988
Marshall, Plymouth	33,500	27,500
Matcham, Plymouth	33,415	28,234
Futcher, Salisbury	32,650	25,318
Call & Pethick, Plymouth	32,475	26,994
Trevena, Plymouth	28,989	£24,089

The reduction in the buildings consists in the omission of the tower, of the third law court, and the buildings adjoining Westwell-street connected therewith. After some discussion and several motions, it was resolved, by a majority of 21 to 10, that the tender of Messrs. Call & Pethick for the whole work be accepted.

AN EPITAPH IN ALL SAINTS' CHURCH, LEICESTER.

SIR,—I send you a relic of the past which I found hanging in this fine old church, which is sadly in want of restoration, or it will tumble down.

The charity now amounts to 20*l.* a year, and is disposed of as follows:—10*l.* are paid to the Vicar of St. Nicholas; 3*l.* 6*s.* 8*d.* to Trinity Hospital; and 6*l.* 13*s.* 4*d.* to ten poor persons. H.

"In this churchyard doth lye the corps
Of William Norrice, dead and gonn,
Whose grave from all the rest is knowne
By finding out the greatest stone;
A homely tombe, yet grac'd with fame
Of worthy works which he had don;
A monument which he did choose
Before his howre-glasse was runn.
Thrice fifteene groats he did bestow,
Which yearly ever shall renew,
And to be given to All Saints poore
On the feast day of Barthol'mew.
O, happy All Saints that hath bredd
Such saints on earth to feed thy poore;
Let saints in Heaven and earth below
Give prayses to the Lord therefore.
Five marks he gave unto the schoole,
An annual stipend for to bee,
And that it shall be yearly pay'd
To the second Master of the three.
There was he grac'd with serving twice*
The office of the Majoraltye;
Three wives he had, and had his will
To be entombed amongst them three.
But death, the end of flesh and blood,
Did wound to death the good old man;
Though ninety-six yeares liv'd on earth,
Yet was his life in length a span. J. B.
1615."

* On the board opposite is, "He departed this life January 8th, 1615."

a minimum breaking strain of 21 tons per square inch, and an average stretch of 1¼ in. in 12 in lineal. For rivet iron an average breaking strain of 18 tons per circular inch. For bars intended for chains, couplings, &c., an average breaking strain of 22 tons per square inch, and an average stretch of 1⅛ in. in 12 in. lineal. For ordinary classes of work, let at competitive prices, stronger iron could only be obtained with difficulty.

In the consideration of the practical limit of strain to which 1 square inch of wrought iron could with safety be subjected, and the principle on which such a limitation rested, the erroneous impression, as to the degree of strain being 10 tons or 12 tons per square inch which first produced "permanent set," was pointed out; as well as the apparent discrepancy between the results of ordinary observation and of minutely manipulated experiments, such as those of Sir William Fairbairn and Mr. E. Clark, wherein permanent set had been observed after 3 tons per square inch had been imposed on the iron, and was explained by the difficulty of registering such small amounts of set as $\frac{1}{1250}$ part of an inch in 5 ft., which resulted from a strain of 10 tons per square inch.

Attention was drawn to the fact that upon the application to 1 square inch of wrought iron of strains exceeding about 12 tons, the measure of stretch per unit of strain, which had previously increased in a certain proportion to the units of strain applied, increased with a greater and progressive rapidity. It was also noted that the amount of stretch actually produced by the imposition of a strain of about 12 tons per square inch, would be sufficient frequently to preclude the use of wrought-iron so strained.

In illustration of the effect of the repetition of strains on iron and steel, it was stated that with blows powerful enough to bend bars of cast-iron through one-half of their ultimate deflection (that was to say, the deflection which corresponded to their fracture by dead pressure) no bar was able to stand 4,000 of such blows in succession. And also that when the bar was thrown into a violent tremor, then "when the depressions were equal to one-half of the ultimate deflection, the bars were broken by less than 900 depressions." A piece of rail weighing 68 lb. per yard, made of Bessemer metal, which, when placed on firm bearings 3 ft. apart, bore one blow from a weight of 1 ton falling through 30 ft. without breaking, though bending about 7 in., broke with a weight of 3¾ cwt., falling 15,400 times through heights increasing from 1 ft. to 10 ft. by increments of 6 in. each time. With wrought iron, it appeared from an experiment of Wm. Fairbairn that when it was desired to repeat the application of strains from two to three million times it would not be prudent that such strains should exceed 7 tons per square inch of section.

It appeared from these considerations that the practical strength of wrought iron in structures of a permanent character could not be estimated at more than 12 tons per square inch, when such an amount of strain was repeated more than a small number of times; and that it should not be calculated as exceeding 7 tons per square inch when strains of this amount would be applied to it many times daily. In some of the principal suspension-road bridges it was said that a maximum of about 9 tons per square inch of section in tension was imposed on extraordinary occasions, while railway bridges were frequently subjected to the maximum calculated strain, a limit of 5 tons being in this country generally adopted. From this practice it was assumed that a margin, for errors of design and for other practical defects, of only 25 per cent. was allowed in permanent structures. The importance of sound principles of design was, therefore, manifest. The parts most difficult to design were the connexions of portions of the structure with riveted joints.

The author next directed attention to the unsatisfactory state of the knowledge of the profession respecting the power of struts of various proportions and forms to resist compression, and stated his belief that the formulæ which had been proposed to facilitate calculations for determining the strain which such columns would bear, produced results which agreed neither one with another, nor with any series of such experiments as had been tried. It seemed probable that, for the present, error might be best avoided by referring to the results of experiments that had been made upon columns, &c., the conditions of which were analogous to the case under consideration.

ARCHITECTS' DRAWINGS: THE LIVERPOOL ARCHITECTURAL SOCIETY.

A SPECIAL meeting of the professional members of the Liverpool Architectural Society was convened at the office of the president (Mr. H. H. Vale), on Tuesday last, to consider "what further steps (if any), should be taken by the society, in order to strengthen the position of the profession with regard to the question of the right of property in architectural working drawings, and render assistance to Mr. E. M. Barry in resisting the demands which have been made upon him by the First Commissioner of Works." A good many written statements and opinions, from various members of the profession, as to the custom with regard to possession of drawings, were laid before the meeting; all the writers concurring in the view that after the completion of a building, the drawings reverted to the architect as his property, and stating that they had never given up any drawings under such circumstances, except as a matter of courtesy in special cases: though as to the ownership of drawings of buildings *not* carried out, opinions were not so unanimous, one or two members being of opinion that the question was in this case a doubtful one. We have space for only one or two quotations, which bear strongly on the general principle of the matter. Mr. Kilpin, in enforcing the rule that the client pays for the *building*, not for the drawings, observed that,—

"When a picture is ordered, the purchaser, when he receives it, never thinks of claiming the preliminary sketches which are necessary for the production of any great work of art; so an architect's client should be satisfied with the possession of the finished building, without demanding the preliminary drawings necessary to produce it."

Mr. H. P. Horner was of opinion that,—

"The production of the building is the end and result desired, towards which the architect's drawings are his intellectual tools, just as the models and casts made by a sculptor, or the sketches of a painter, are theirs towards the production of works in their respective arts; and to the possession of such implements of *these* arts I have never heard of any pretence of a claim by patrons or clients."

Mr. T. D. Barry observed that,—

"It was extremely common for architects, during the progress of an extensive building, to make detail drawings on *boards* provided by the contractor: surely in such a case the client could not lay claim to the boards so supplied!"

The chairman also was of opinion that,—

"If the drawings and specifications are to be claimed as a right by the client, either before or after the architect's final certificate has been given, the position both of the architect and builder will be much prejudiced; for should every little matter in the building works not agree to the letter with the plans and specifications, an unscrupulous client might use these as levers for his own advantage against both the architect and the builder; for we well know that in practice many modifications not shown either on the plans or in the specifications have to be made during the progress of the works, and not unfrequently at the suggestion of the client, and solely for his benefit."

Another leading member was of opinion that,—

"The idea of a client claiming the drawings and specification was too absurd to discuss; a man may with equal propriety claim the scissors from his barber after his hair has been cut."

In illustration of the possible consequence of the client having possession of the working drawings, it was mentioned by another member of the society that a gentleman who had bought a house recently completed from his designs, had endeavoured to obtain the drawings of it from the contractor, with the avowed object of building another house like it in another part of the country. Other statements, from Mr. G. Williams, Mr. Hornblower, Mr. Boult, Mr. Mercer, Messrs. Atkinson (of York), and others, were to the same general effect; Mr. C. H. Beloe and Mr. Deacon also expressed similar views as to the practice in the profession of civil engineering: one member only among those present, Mr. Partlow, dissenting from the general opinion.

With regard to the possibility of offering further assistance to Mr. Barry, it was mentioned that the Manchester Society of Architects had offered to join in any general subscription to assist him in the legal expenses he might be put to in contending the matter, and in pursuance of the same idea the following resolution, proposed by Mr. H. P. Horner, and seconded by Mr. T. D. Barry, was adopted by the members present:—

"That, having already pledged ourselves, as members of this Society, to give our best moral support to Mr. Barry in resisting the claims of the First Commissioner of Works, we further pledge ourselves, in the event of material aid being required in carrying on the contest, to afford the best assistance in our power, and to influence the members of the profession within our knowledge towards the same end."

THE LATE MR. HANDYSIDE RITCHIE, SCULPTOR.

THIS able Scottish sculptor has recently died. He was born in Musselburgh, near Edinburgh, in the year 1804; and, from his earliest youth, perseverance and enthusiasm—the sure tokens of genius—were marked features in his character. He became a modeller in his childhood. His father was an ornamental plasterer. Mr. Leonard Horner aided him in his youth. He went to Rome, and through the influence of the Duke of Hamilton and Earl of Minto he was received into the studio of Thorwaldsen. He produced many well-known works in sculpture, among which was one of Kemp, the architect of the Scott Monument, who was an intimate friend of his. For many years he was an exhibitor with the Scottish Academy, of which body he was elected an Associate in 1846. In 1847 Mr. Ritchie was commissioned to execute for the Houses of Parliament statues of Eustace de Vesci and William de Mowbray; and he executed his commission to the utmost satisfaction of the Commissioners. He long devoted himself principally to architectural sculpture, which, from its size and nature, is not adapted for an exhibition-room. Every one who knows Edinburgh must have observed the admirable works of this kind at the British Linen Company's Bank, St. Andrew-square; in the pediment of the Commercial Bank; and on many other commercial buildings. One, however, is deserving more than a passing notice;—the very fine monumental group of the Rev. Dr. David Dickson comforting the widow and orphans at the West Church. He sculptured the four colossal heads representing the Seasons at the Duke of Hamilton's Mausoleum at Hamilton Palace.

RESTORATION OF THE SOUTH AISLE OF ST. NICHOLAS' CHURCH, GREAT YARMOUTH.

WITHIN the past twenty-two years the parish church of St. Nicholas, Great Yarmouth, has undergone various restorations. There are few, if any, of its class which surpass it in point of size, it being 230 ft. long by 108 ft. broad, exclusive of the projecting portions of the transepts. The extreme width is 154 ft. It has been computed to have an internal superficial area of upwards of 23,000 ft., whereas the average of London churches is but 8,000 ft., and they contain only 1,000 persons on the floor instead of from 4,000 to 5,000, which is the amount of accommodation afforded within the walls of this structure. Those parish churches which have the greatest pretensions to compete with it in scale are St. Michael's, Coventry, 22,080 ft.; St. Botolph's, Boston, 22,270 ft.; St. Botolph's, Newcastle-on-Tyne, 20,110 ft.; Holy Trinity, Hull, 20,036 ft.; and Holy Trinity, Southwark, 18,200 ft.

The aisle recently rebuilt is that which was erected in the thirteenth century to supersede the narrow one of the Early Transitional Church of which the present nave was a part. It is of the colossal width of about 40 ft. internally, and is lighted by a triplet in the west end and seven windows on the south side, of the latter of which the internal jambs and arches were the only original portions which remained; these had on the outside been filled with Perpendicular mullions and tracery of a poor type. Mr. Seddon, the architect employed, has restored the early portions and swept the rest away, having superseded them by three light windows of an Early Geometrical character in harmony with the rest of the structure. The alternate windows vary in detail, and form a feature from the principal approach from the town. Between each pair of windows a buttress, finished with a gabled canopy, rises to the level of the parapet. The great western triplet, of which sufficient traces were left to enable the architect to effect a strict restoration of the original, except that the tracery of the window openings, if any, had been obliterated, have been treated in the same character as the side windows, with which they now harmonise. An entirely new roof has been placed on the aisle. The material is of Memel, but the ceiling below, of an arched form, is of oak. This is divided into panels by moulded ribs, with the old heraldic bosses of the former one replaced at the intersections. These ribs and bosses and the wooden cornice above that of stone have been decorated with colour.

The roof is covered with lead, and its ridge with an ornamental cresting, and the gables

coped with stone with carved crosses at each end of the aisle. Some fragments of polychromatic decoration were discovered on the interior of the walls, and as the new plaster would at present have destroyed any reproduction of them, they have been copied on paper and temporarily fixed to show the effect which it is hoped may ultimately be reproduced in a more permanent manner.

One of the windows has been filled with stained glass in memory of the late town-clerk of Yarmouth, Mr. Charles Cory. There are three subjects, one in each light, representing the greater prophets, Jeremiah, Ezekiel, and Daniel. Over each figure an angel bears a scroll. Another window has also been partially filled with stained glass at the expense of the Sunday-school teachers. The subject is a representation of Moses, with the Ten Commandments. The figures are by Mr. Rossiter, the artist; and the glass has been executed by Messrs. Saunders.

Externally the church has received great additional height and consequent dignity, having been dug out of a hole, the earth to the depth of many feet, which had in the lapse of ages accumulated around and about the base course, having been excavated and removed, a space falling from instead of to the walls as heretofore, having been paved with pebbles in ornamental patterns to a surface drain carried entirely round the restored portion of the church. The levels of the approaches to the church have been rearranged accordingly, and an improvement has been thereby effected, but which needs hereafter to be carried out further when the rest of the restoration is proceeded with. The porch now calls for improvement.

THE CONSTRUCTION OF NEW GAS AND WATER WORKS IN YORKSHIRE.

THE present season seems to have been chosen for the construction and extension of new gas and water works to a greater extent than has been the case for some time, and hence builders and others interested in the construction of such works will not object to learn that in the West Riding of Yorkshire, at least, a good deal of work will be found in this branch of the trade. Most of the improvements and extensions which are about to be made are connected either with the opening out or the further development of works in places which are rapidly rising, and which will in a few years rank amongst the most important of Yorkshire towns.

The borough of Barnsley have scarcely completed a very fine plant at Ingbirchworth, near to the Yorkshire Moors, at a considerable cost; and the town council have just accepted tenders for the construction of two service reservoirs, a cottage, and other works at Champney Hill, about three miles from the borough. The works, which have been constructed under the superintendence of Mr. Hawksley, may be said to be equal to any in Yorkshire.

The town of Keighley, which at present is aspiring to Parliamentary honours, is just now taking active steps to secure for the inhabitants a reliable supply of pure water. During the past week tenders were opened for the construction of a service reservoir in the county of Lancaster, and a compensating reservoir near to that town, together with the necessary works connected therewith. The engineers intrusted with the superintendence of the work are Messrs. M'Clean & Stileman, of Westminster.

The rapidly-rising town of Castleford will shortly possess its own waterworks. The water is to be obtained from a pumping shaft in Wheldale-lane, and a reservoir is in course of construction at Red-hill.

At Otley, a thriving town near Leeds, new waterworks are in course of construction at the present time.

The inhabitants of Normanton are also busy discussing the best mode of obtaining good and cheap water.

It will thus be seen that undertakings of no small character, involving the outlay of considerable sums, are about to be commenced, so that a good deal of work may be looked forward to from this source.

The extension and construction of new gas-works in Yorkshire seem to be larger and even more extensive than are the contracts for water-works at the present time.

The Barnsley Gas Company are laying out a new plant at Old Mill, a suburb about half a mile from the borough, so as to enable them to supply the more elevated parts of the town and district. The works are of an extensive character, and include sheds, retort-houses, and all the necessary building for carrying on a very large business. The buildings, which are of a neat and ornamental character, are being erected by Mr. W. Robinson, of Barnsley, builder, under the superintendence of Messrs. T. & C. Hawksley, civil engineers.

At Wombwell, near Barnsley, a new company has been formed, on the limited liability principle, for the purpose of supplying the district with gas. The necessary works are in the course of construction, and it is expected that gas will be supplied to the inhabitants by the end of August.

New works are in the course of construction at Normanton, and preparations are being made to erect eight retorts, benches, or ovens, and thirty clay retorts.

The Bingley gasworks are also about to be extended, and the company now find it necessary to lay over 4,000 yards of new mains.

At Gomersal, another prosperous West Riding town, the works are to be enlarged. A new gas-holder is about to be erected on a piece of land adjoining the present plant, so as to meet the requirements of the district.

The Shipley Gas Company, near Leeds, are also about to make alterations and extensions. The company propose to erect a new retort-house, engine-house, meter-house, and make other extensions of their works, which have been rendered necessary by the increasing population and the development of trade generally.

THE MANUFACTURE OF PORTLAND CEMENT.

INSTITUTION OF CIVIL ENGINEERS.

ON Saturday last, the 21st of May, a party of nearly fifty of the students of the Institution of Civil Engineers, under the guidance of Mr. Brunlees, member of Council, visited, by special invitation, the cement works of Messrs. John Bazley White & Brothers, at Swanscombe, Kent, for the purpose of receiving an explanation as to the process of the manufacture of Portland Cement. The invitation was given by Mr. G. F. White, now one of the oldest associates, who was present at one of the weekly meetings of the students, when a paper was read by Mr. Preston, Stud. Inst. C. E., on the subject of the manufacture of cement. All the members of the firm were present to conduct the visitors over the manufactory, which stands on the banks of the Thames, and covers an area of fifty acres. The mixing of the chalk and the clay, in the proportion of three parts of the former to one part of the latter, takes place in a series of double circular mills, about 12 ft. in diameter, and 3 ft. deep, touching one another, and each furnished with revolving harrows, to secure the perfect reduction of the particles. The chalk is delivered in lumps into one of these mills, which is kept constantly supplied with water, and the liquid passes thence to the other mill, where it receives the clay. After remaining long enough under the harrows the mixture is pumped up to a height of some feet, whence it flows by gravitation through wooden spouts into large reservoirs called "backs," where it lies till drainage and evaporation have disposed of the greater part of the water. While the liquid cement is in the "backs," samples of it are constantly taken and burnt in a sample kiln, so that any defect in the proportions is at once detected and remedied. The residue is then transported, first to drying stoves, and afterwards in due time to the kilns, where it is to be burnt. These are constructed on the endless principle, and are bell-shaped. They are about 30 ft. high, and are fed near the top with alternate layers of cement and gas-coke. As combustion goes on, the clinker is drawn periodically from the bottom of the kiln; and, after the rejection of any that is insufficiently burnt, it passes to the mills for grinding. Special care is taken to do this thoroughly, as the strength of cement is found to be greatly enhanced by fineness of grinding. A visit was paid to the testing-room, where samples of the manufactured cement are made hourly through the day. Some of these were selected by Mr. Brunlees, and the strain required for breaking them ascertained by the machine. The Messrs. White explained that the heavier cements, produced by excessive burning, were slow in setting, although ultimately acquiring a higher tensile strength than the lighter cement; but they expressed their opinion that the quality of cement that would insure undoubted stability, without increasing its cost by the diminution in volume that is inseparable from a very high specific gravity, was the best suited for general purposes of construction. When the inspection was concluded, the students were entertained at lunch by Messrs. White, who explained that they would be ready, on all occasions, to contribute in every way to the furtherance of the technical education of the younger members of the profession.

ST. JOHN'S, WICK, NORTH BRITAIN.

ON the 13th inst. this church was opened and consecrated by Bishop Eden, the Primus of the Scottish Episcopal Church.

The edifice, which is Early Decorated in style, is built from the design of Mr. Alexander Ross, architect, Inverness, and consists of north porch, nave, chancel, vestry, and organ-chamber, the west gable of nave being surmounted by a lofty stone belfry. The walls externally are of blue Caithness stone in courses; the dressings, of white Covesea freestone.

Entering the porch, through a moulded archway, resting on carved imposts, we pass into the nave, which consists of four bays, lighted by a three-light traceried window at west end, and by lancets along the sides. The chancel is raised three steps above the nave. The chancel arch is of stone, well moulded, and with carved imposts. The chancel is lighted by a three-light east window, and by a cinquefoil window on the north side. The roofs are of varnished pine, the principal couples resting on moulded arch ribs springing from stone corbels in the walls. The benches, choir-stalls, and pulpit are all of red pine, varnished; the lectern of iron and brass.

The font, which stands at the west end of nave, is of Caen stone, with carved bowl and capital, resting on a shaft of polished red granite.

The windows are meantime filled with plain cathedral quarry glass. The church is seated for about 150.

An interesting fact connected with this church is, that it is the first Episcopal church built and consecrated in Caithness for the last 200 years, and the organ is the first introduced into the district.

THE WORKS OF WREN AND RESTORATION.

SIR,—As an ardent lover of architecture, and one who has a firm faith in the reputation of the great architects, established as the masters of their art by the consent of centuries, may I beg space for a few observations upon the late meeting of the Institute of Architects, reported in your Number of the 21st inst.?

I do not pretend to assert my own taste, but I believe in Sir Christopher Wren. With this view, ever since I have held a seat in Parliament, I have lost no opportunity of endeavouring to preserve his works from the hands of the destroyer. In 1860 I inserted a well-known clause in the "Union of Benefices Act." In 1865 I did my utmost, unhappily without result, to induce the Government of the day to purchase the Gateway of the "College of Physicians," ruthlessly pulled down, to widen Warwick-lane; and in 1868, with the assistance of the City authorities and the then First Commissioner of Works, I succeeded, notwithstanding the strenuous opposition of the present First Commissioner (Mr. Ayrton), in saving the tower of St. Mary Somerset, then under sentence of removal.

But utilitarian destructives, without the pale of art, are not the only enemies the works of Sir Christopher have to fear. There are other foes, within that pale, more dangerous in their action, and more deadly in their aim. I allude, in plain terms, to the modern church restorers, and their proceedings during the last few years. Not long ago, an eminent modern "Goth" actually prepared a plan, happily defeated, to take down the fine church of St. Dionis Backchurch, in order to substitute in its place an eccentric extravagance of his own composition. Then followed the lamentable so called restorations of St. Michael's, Cornhill, and St. Mary's, Aldermanbury. St. James's, Garlickhithe, fortunately escaped with a few ugly scratches, and the addition of an ugly font; but St. Swithin's, Cannon-street, stands in full view of the crowds who daily frequent the great railway station, as a striking example of the incapacity of a builder to whom detail and proportion are equally unknown. I should have hoped that this last

sacrifice might have appeased the mania of the "Goths" for some time to come, but now we are threatened with a crusade to "repair and beautify" the City churches, and to deform and deface them to suit the crotchets of Mediæval revivalists. With these facts before him, Professor Donaldson might well express his astonishment at the period at which we are arrived, and point to the consternation which any proposal to *improve* the architecture of Wren would have created in the profession fifty years ago! I concur with the eminent and learned professor "that we have now reached an irreligious epoch as to architecture." And why is the epoch thus irreligious? Simply because our dabblers in art, misled by the follies of Pugin-ism, Ruskin-ism, and Pre-Raffaelite-ism, and other theories of artistic charlatans, have never acquired any true principles; and, with the irreverence of ignorance, venture to sneer at works of the highest merit, which this age, at least, will never reproduce.

Until modern church-builders come to their senses and learn a little humility, as well as other necessary things, I think we had better let Wren alone; for my own part, I prefer to see his unrivalled interiors in their dingy and dirty condition rather than arrayed in the gaudy vulgarity of St. James's Hall, the Alhambra Palace, and the New Foreign Office.

House of Commons. G. C. BENTINCK.

A PLACE OPEN TO MERIT.

WE understand that there is a vacancy in her Majesty's Office of Works for an assistant surveyor. The salary is 500*l.* per annum, increasing to 700*l.* The First Commissioner, we learn, has determined to receive applications from duly qualified persons, and to deal with them on their merits, without reference to patronage.

THE BELFAST EXHIBITION.

THE Belfast and North of Ireland Workmen's Exhibition, in the Ulster Hall, has been opened by the mayor, in presence of other official personages, and the public generally.

The Exhibition occupies the Major and Minor Halls, and a considerable space of ground at the northern side, which has been prepared for the purpose. This superadded space is allotted to machinery, the Minor Hall to an ample fine-art collection, and the Major Hall to general products. It is not exclusively a Workmen's Exhibition, in the sense of being confined to a display of articles produced immediately and directly by workmen. A considerable demand upon the space was made by manufacturers and others who are also large employers. Still, the display made by working men is sufficient to justify the name of the Exhibition, and to afford much promise for the future. As a typical assortment of the manifold industries of the province, it is equal to what had been anticipated by friends of the movement. The hall is gay with flags and banners, and brilliant cases of goods of every description. The centre is occupied by a trophy, composed of various kinds of linen, which, commencing on the floor, stops short just inside the lofty ceiling. Separate spinning-wheels, made by Mr. M'Creery, are displayed, and many people, says our authority, the local *Newsletter*, seem to wonder what they are. On every hand there are assortments of fabrics illustrating the industry which has made this province what it is. There are also cases of architectural embellishments and building materials, among which is placed a bust—"The Sea-King," by M'Dowell, lent by Lord Dufferin; furniture and upholstery; with a long array of etceteras.

The Lord Lieutenant was present at a *conversazione* in the evening of the day of opening.

THE SANITARY TEACHINGS OF HISTORY.*

THE health history of England, up to the close of the eighteenth century, may be distributed, Dr. Guy, the well-known sanitary investigator, thinks, into three periods, as follows:—

1. From the earliest time to the middle of the fourteenth century, the epoch of the Black Death.

2. From the middle of the fourteenth century to the year 1666, the date of the Fire of London.

3. From the year 1666 to the end of the eighteenth century.

The first period is marked by scanty records of frequently-recurring epidemics; the second, by the occurrence of the Black Death, Sweating Sickness, and Plague, concerning which we possess fuller details; and the third, by the great discoveries and reforms in connexion with the well-known names of Baker, Cook, Howard, and Jenner.

Of the London Plague we have before occasionally written, as have many others. We shall, therefore, now glean a few particulars as to its dread predecessor, the Black Death, from Dr. Guy's very interesting lectures in King's College, under his new professorship of Hygiene.

The Black Death, though usually treated as an aggravated outbreak of the Oriental plague, which is, by very general consent, traced to Egypt as its birthplace, has had assigned to it an origin more remote. Hecker fancies he finds the source of it in China in 1333, fifteen years before it showed itself in Europe; and Anglada, in his "Étude sur les Maladies éteintes," traces it by three distinct routes from Black Cathay,—the northern route by Bokhara and Tartary, the Black Sea and Constantinople, having brought it by the Bosphorus into the Mediterranean, and so into Europe. In the interval between 1333 and 1347 China was visited with drought, famines, torrents of rain, floods, earthquakes, swarms of locusts, and pestilence; and at length, in 1348, Europe began to suffer by the same visitations. The island of Cyprus was converted into a desert by a frightful earthquake, hurricane, and inundation, following the outbreak of the plague; and there was observed, what was noticed in many countries and cities afterwards, a peculiarly offensive state of the air, sometimes spoken of as a stinking mist, possibly due to the dead locusts which had "never perhaps darkened the sun in thicker swarms," and by countless unburied bodies of men and beasts. On the 25th of January of this same year, 1348, an unexampled earthquake, lasting several days, visited Greece, Italy, and the neighbouring countries, shaking down or swallowing up whole villages, and inflicting severe injury on every large city. Others occurred, from time to time, in all parts of the continent of Europe, and in England, up to the year 1360.

The Black Death reached England in August, 1348, appearing first in the county of Dorset, thence spreading through Devon and Somerset, to Bristol, Gloucester, Oxford, and London; in fact, through the whole country. It took three months to reach London. Few places are believed to have escaped, and only a tenth part of the inhabitants were thought to have remained alive. There is no room to doubt that the symptoms of this Black Death were those described as belonging to the Oriental plague. All the accounts that have come down to us, from the imperial author, Kantakusenos, who saw the disease in Constantinople; from Boccacio, who witnessed it at Florence; from the scholar, Raymond Chalin de Vinario; and from the "brave" Guy de Chauliac, who practised at Avignon, all the accounts conspire to justify Hecker's statement, that "It was an Oriental plague, marked by inflammatory boils and tumours of the glands, such as break out in no other febrile disease;" to which must be added, that it often proved fatal on the second and third day, in the midst of profuse discharges of offensive-smelling blood from the lungs, such discharges as we now know to attend and characterise gangrene of those organs. Guy de Chauliac, than whom we can have no better authority, divides the whole epidemic of seven months into two stages of two and five months respectively, of which the first was characterised by the bloody discharges from the lungs, the second by the characteristic plague-tumours.

The mortality due to this disease cannot be exactly ascertained, from want of censuses and registers of death; but doubtless it was on a grand scale. We infer this partly from numerical statements and partly from more general accounts. Let us take them by cities, communities, and nations.

Aleppo lost 500 a day; Gaza, 22,000 in all; and Cairo, 15,000. Genoa lost 40,000; Parma, the same number; Naples, 60,000; Siena, 70,000; Rome an incalculable number. Venice, out of a population of 200,000, lost 70,000; saw ninety patrician families extinguished, and its grand council of 1,250 reduced to 380. In Florence, 100,000 perished between the months of March and July. In Spain, Valentia lost 300 a day, and many districts of Barcelona were depopulated. In Germany, at Vienna, the deaths were 1,800 in one day, and 40,000 in all. At Erfurt, 12,000 were interred in one cemetery. In France, at Avignon, 1,800 died in the first three days, 150,000 in the city and its environs, and at the very first, sixty-six monks in a Carmelite monastery; there, too, died Petrarch's Laura. Montpellier was very nearly depopulated, ten out of twelve consuls died, not a monk survived, and few medical men. Marseilles lost in one month 56,000, and the bishop and his chapter all died. Narbonne suffered a loss of 30,000, from which it never recovered. Paris lost 50,000, and St. Denis, 16,000; and for many days together the Hôtel-Dieu sent 500 corpses to the Cemetery of the Innocents. We lost here in London 100,000, out of a population very small by comparison to what it is now.

Passing from cities to nations, we find the mortality in China, whence the plague is supposed to have sprung, set down at *thirteen millions*; in Germany, it was 1,244,434. Europe is supposed to have lost an aggregate of forty millions, and Asia and Africa (exclusive of China) twenty-four millions.

Here, as throughout Europe, the pestilence had antecedents worth noting. The times were very barbarous. Kings were in constant conflict with powerful subjects or engaged in external wars; cities were fortresses; the roads were beset with marauders; the husbandman was a serf; human life was of little account; witches and heretics were burned alive, and the Jews subject to cruel tortures; "wild passions, severity, and cruelty, everywhere predominated;" and what is more to our present purpose, the cities were, "with few exceptions, narrowly built, kept in a filthy state, and surrounded with stagnant ditches." These conditions, even in those early times, were recognised as favourable to the spread of pestilence, as were personal uncleanliness and intemperate habits.

The cities in those days were so built as tobe eminently favourable to that overcrowding now so universally recognised as a most efficient cause of disease. Armies, also, which are crowds in the worst form, were in constant accumulation.

The accounts of the disease in England are in harmony with those which have come to us from Italy and other parts of the Continent. We read of the same atmospheric disturbances, with the addition that its advent was preceded by great floods. "It rained from Christmas to Midsummer, without one fair day;" and when it left us, "there followed a great dearth of cattle; after that a dearth and scarcity of corn." We read of 5,000 cattle dying in one pasture, of beasts and sheep going wild through fields and "corns," and dying in holes, furrows, and ditches, in innumerable multitudes over the whole kingdom, from want of keepers; of the scarcity and insolence of servants, and consequently, the next harvest, of corn rotting in the fields from want of hands.

In England, as elsewhere, the Jews were accused of *poisoning the springs*, and this accusation Short traces to the fact that *the water was pestilential* even to the fishes. Of this widespread belief in the poisoning of wells and springs of water, not in the time of the Black Death only, but during all great epidemics, as Dr. Guy observes, recent discoveries have rendered it highly probable that the people were not always mistaken as to the fact of the poisoning, but only as to its nature and the persons who caused it. In those remote times the state of the places in which men lived, and their habits of life, rendered the pollution of drinking waters *by human excreta* inevitable, and so secured the rapid spread of any contagious disease that happened to prevail.

The dwellings and personal habits of the English people in town and country were such as to encourage to the utmost the pestilence we bred or imported. Judging from the descriptions of foreigners, we were characterised by bad housing and gross feeding.

The people lived probably somewhat after this fashion:—Their houses, and most of their buildings of every kind, were of timber, the houses "slightly set up with a few posts and many radels," "cast all over with thick clay to keep out the wind," with sundry rooms above and beneath, "covered with straw, sedge, or reed, and rarely with tiles or slate," and with floors of mud. In the country parts, houses, stables, and offices were under one roof. The fires were lighted against a *rere-dos*, and the

* Public Health: a Popular Introduction to Sanitary Science; being a History of the Prevalent and Fatal Diseases of the English Population, from the earliest Times to the End of the Eighteenth Century. By William A. Guy, M.B., F.R.S., &c., Professor of Forensic Medicine and Hygiene in King's College, London. H. Renshaw, Strand. 1870.

smoke escaped as best it could, without the help of chimneys; for these, though introduced in the twelfth century, were but slowly acclimatised. The people lay on straw pallets or rough mats, with a log for a pillow; and the man who contrived to buy a flock bed, and a sack of chaff for his head to rest upon, "thought himself as well lodged as the lord of the town." Servants were lucky if they had a sheet above them: they had none beneath. The sheep's skin was in common use as clothing. The poor, wanting water, built at the river's edge. The Spaniards, in Queen Mary's day, wondered "when they saw what large diet was used in many of these so homely cottages," and one of no small reputation among them is credited with the not very complimentary remark, that "The English have their houses made of sticks and dirt, but they fare commonly so well as the king." The poor are believed to have lived well, in good years, on barley or oaten bread, beer, and pork; but to have been subject to famines frequent and terrible. There was an abundant supply of fish both from sea and river. Pearson tells us, that "the vineyards the Romans had planted survived Saxon and Dane;" that "Gloucestershire was famous for them, and Smithfield was once ruddy with grapes. But gardens were of slow growth, and comparatively few fruits and vegetables had been naturalised." It is likely, therefore, that many of the people living of necessity, or through ignorance, on a diet from which the vegetable element was excluded, suffered the more severely in times of pestilence. And thus it happened, that "poisoned by marsh exhalations, wasted by ague and skin diseases, huddled together in cabins, smoke-dried, gross eaters, and uncleanly livers," the peasants suffered terribly during every epidemic visitation. Within our walled and fortified towns, the state of things was not likely to be much better. Thus a passage in Stow's Chronicles states, that even capital cities were unpaved till towards the end of the twelfth century.

"This year, 1246," he says, "the city of Lubeck was destroyed and consumed by fire," "and from that time it was ordered that they should not cover their houses any more with thatch or straw, but with tiles or such like:" the very same common danger caused London to tile all its houses shortly after, especially such as stood close together in a high street. "Neither were there then but few streets in London paved, nor in two hundred years after this, except Thames-street, and from Ludgate to Charing Cross, neither was the great city of Paris paved until the year 1186."

London, therefore, in the middle of the fourteenth century, was almost wholly unpaved. In the middle of the twelfth century, if we may credit the monk, William Fitzstephen, who died in 1191, London consisted of two long, narrow tracts of land, separated by the Thames, which then abounded in fish. It was surrounded with high walls, strengthened with towers and double gates, with a "tower palatine" on the east, and two castles on the west, and the king's palace in the same quarter on the river, with its walls and bulwarks, separated by two miles from the city. The suburbs were studded with the houses of the citizens, with their gardens and orchards.

Between the epoch of the Black Death and that of our next great pestilence, the Sweating Sickness,—in other words, from 1347 to 1485, a period of nearly 140 years,—England suffered something like a score of epidemics, with their accompaniments of famine and cattle-plague. Among these Dr. Guy notes one of influenza, one of small-pox, one of puerperal fever, two of bloody flux, and two of epidemic madness.

The Black Death, or great mortality of the fourteenth century, was undoubtedly the same disease as the Plague of subsequent times, differing only in degree, not in kind.

The sanitary teachings of the remote past, Dr. Guy thinks, are, that whatever may be the case in warmer climates, it is true in these colder and temperate ones, that the nearer men are to nature, the farther they are from health. In those days when the chief occupation of men was the care of cattle and the culture of a few fruits, and when manufacturing industry was limited to the production of coarse clothing, frail and combustible habitations, and implements for warfare and the chase, they were the prey of frequent famines and pestilences, and subject to a rate of mortality, of which, in these days, we have happily no experience. How much the contests of rival chiefs, the insecurity of life and property, the condition of serfdom, the absence of roads, the huge unreclaimed tracts of forest and marsh, must have weakened production and strengthened disease, it is not difficult to imagine.

Passing on to the time when men began to collect in cities, and to fortify themselves by walls and moats against lawless violence; when the culture of grain took the place, to some extent, of the care of cattle; we still find both town and country, the dwellings and the habits of the people, hostile to health, favourable to the production of disease at home and the reception of pestilence from abroad.

And even when we arrive at times that may claim to be called civilised; when we had attained to a central and stable government, had long thrown off the incubus of serfdom, had established flourishing manufactures and were carrying on an extensive commerce, had largely improved our agriculture, and taken our first lessons in horticulture, our cities and houses were so squalid and filthy that the plague found itself quite at home in them.

Then, little by little, as civilisation advanced, the twin virtues of cleanliness and temperance asserted their rights. Men bathed and washed oftener, submitted to frequent changes of linen, and admitted tea, coffee, and chocolate into competition with beer, wine, and spirits. They came by degrees to live in better houses and cleaner towns. We saw the last of the plague, and were in the right way to rid ourselves of some, at least, of our home-bred pestilences. But much remained to be accomplished, even as late as the last quarter of the eighteenth century; and into that epoch Dr. Guy fully enters.

One question, the sanitary triumphs of that epoch suggest, for the answer to which we must look forward into the times of which men now living have had experience. Does the history of the last seventy years warrant us in looking forward to fresh sanitary discoveries and triumphs,—to a healthier, and therefore happier, future? He answers this question without hesitation in the affirmative. These are the grounds of his confidence.

In the first place, he is encouraged by the fact that Jenner's singular discovery has proved no idle dream of philosophy, but a great truth, fruitful in results, and in a fair way to realise the most sanguine expectations of its author.

In the second place, he attaches a great importance to the fact, that already this century can boast one capital hygienic discovery, with which the name of Dr. Snow is so honourably connected—the discovery that cholera, to which we may confidently add typhoid fever, may pass from person to person, from house to house, from district to district, in drinking-water. He recognises, too, as very important, that other hygienic discovery due to the independent researches of Drs. Bowditch and Buchanan, that there is a decided relation of cause and effect between dampness of soil and consumption. These two truths must have a grand effect on the future of water-supply and drainage, on the cleansing of our towns, and the application of their refuse, solid and liquid, to our least fertile soils.

In the third place, it is impossible not to feel the great importance which attaches to the happy results that have followed in so many towns, on well-devised measures of drainage and water-supply.

In the fourth place, he draws many inferences highly favourable to our future progress in hygiene from the modern history of medicine.

In the fifth place, it is difficult to exaggerate the value of the mortuary returns now obtained from every part of the United Kingdom, or of the special inquiries set on foot by the medical officer of the Privy Council.

And lastly, he augurs well for the future from the change slowly, but surely, coming over the public mind. It is being taught in many ways, that the policy of palliation, in which we have so long indulged, is eminently unfruitful and positively mischievous. The time is evidently approaching when the preventive philanthropy (as Dr. Guy calls it) that guided the footsteps of Howard, will fill the hearts of the people, and the policy of prevention become the one rule of action of the Legislature.

NEW CAPITOL FOR THE STATE OF NEW YORK.

STATE houses or capitols are rising in various parts of the United States, and we have already given views of more than one. The site of the building at Albany illustrated in our present number is very commanding, being about 170 ft. above the level of the Hudson, and has an area of ten acres. It is bounded on the south by State-street, and on the north by Washington-avenue, 100 ft. in width. The land falling off rapidly to the north, south, and east, this building, with its high walls, still higher pavilions, turrets, and towers, will be seen to advantage. In the exterior composition of the design, there is a general adherence to the style of the pavilions of the New Louvre, of the Hôtel de Ville of Paris, and the Maison de Commerce recently erected in the city of Lyons. The terrace which forms the grand approach to the east or principal front will form a striking feature.

The exterior is 290 ft. long north and south, and 390 ft. east and west. The floor immediately above the level of the plateau of the terrace will be entered through the porticos on Washington-avenue and State-street, and through the carriage entrance under the portico of the east front. The first or main entrance-floor will be reached by a flight of steps on the east front leading to the loggia, or hall of entrance, occupying an area of 60 ft. by 74 ft., and 25 ft. in height.

Communicating directly with this hall are two grand staircases, which form the principal means of communication with the second and most important floor. On the left of this hall are a suite of rooms for the use of the Governor and his secretaries, and military staff. On the right are rooms for the Secretary of State, Attorney-General, with corridor leading to the Court of Appeals. On the second or principal floor will be placed the Senate and Assembly chambers, and the State library, all of which (in elevation) will occupy two stories, making 48 ft. of height. Rooms for the committees and other purposes will also be placed upon this floor. The Senate Chamber will be 75 ft. by 55 ft. on the floor, with a gallery on three sides of 20 ft. in width. The Assembly Chamber will be 92 ft. by 75 ft. on the floor, surrounded by a similar gallery, which in both chambers largely increases the areas of the upper portion. The library will occupy the whole of the east front of these two stories, and will be 283 ft. long and 54 ft. wide. This will be the most attractive room in the building. Its large area and lofty proportions, its view towards the north, east, and south, overlooking the City, and bringing in the valley of the Hudson and its western slopes for miles in each direction, will make it a favourite place of resort at all seasons of the year. The main tower is 66 ft. square, and about 320 ft. in height. In the centre of the building will be an open court of 137 ft. by 92 ft. This court will be an attractive feature, being treated in the same manner as the exterior fronts, and will no doubt ultimately have its fountains and be surrounded with statuary. The entire structure will weigh 150,000 tons; but the great inequalities in the heights of the various walls, and the distribution of the enormously heavy fire-proof floors, and roofs sometimes laden with deep snows, will bring very unequal weights upon the parts of the foundation adjacent to each other, and without great care they would settle unequally and crack the walls, as is so frequently seen in modern private, and even in many public buildings. In the States the stone foundation of the walls commences on concrete, and is made of large blocks of close-cut limestone of from two to six tons weight, laid in regular courses, the first one of nearly the width of the concrete, and each successive one narrowed by offsets, until the wall is contracted to the width necessary to support the superstructure, arranged so that they will afford an equal bearing on each side of the line of the centre of gravity of the walls and the weights which they are to sustain. The work has been carried on with very rapid progress. The commissioners appointed for the erection of this building are Messrs. Hamilton, Harris, John V. L. Pruyn, O. B. Latham, James S. Thayer, Alonzo B. Cornell, William A. Rice, James Terwilliger, and John T. Hudson.

We give a plan of the ground floor, and shall give a plan of the floor above on another occasion.

The architects are Messrs. Fuller & Laver, of Albany; and Mr. W. J. McAlpine is the engineer.

The buildings are being constructed by day-work, under the immediate superintendence of Mr. J. Bridgford, a well-known builder of this State.*

* We must mention that these illustrations have been some time in preparation, and that meanwhile a view of the building has appeared elsewhere. We shall in time learn to know those architects who send special invitations to half a dozen journals at the same time to illustrate a work, and say nothing of their having done so.

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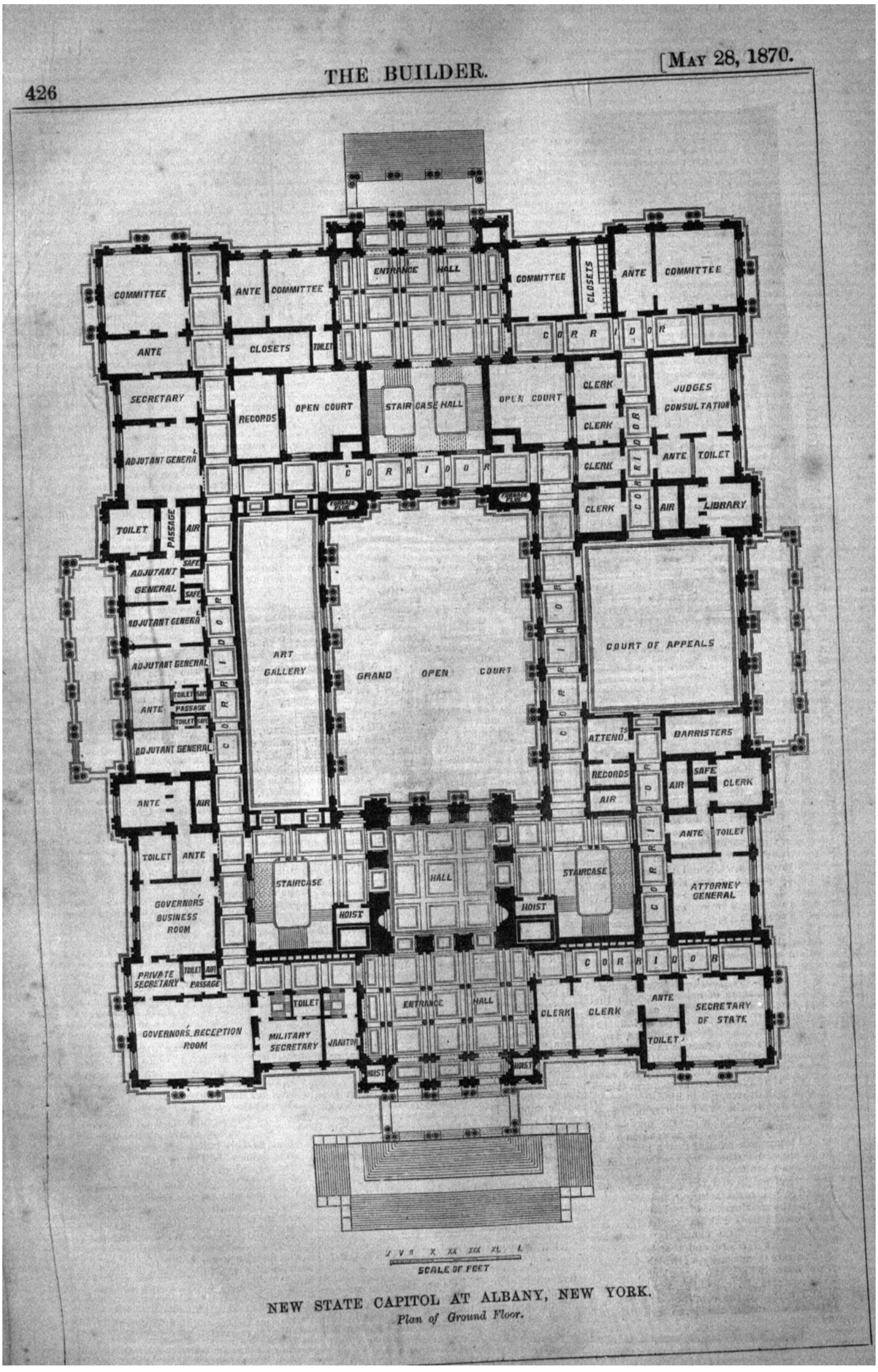
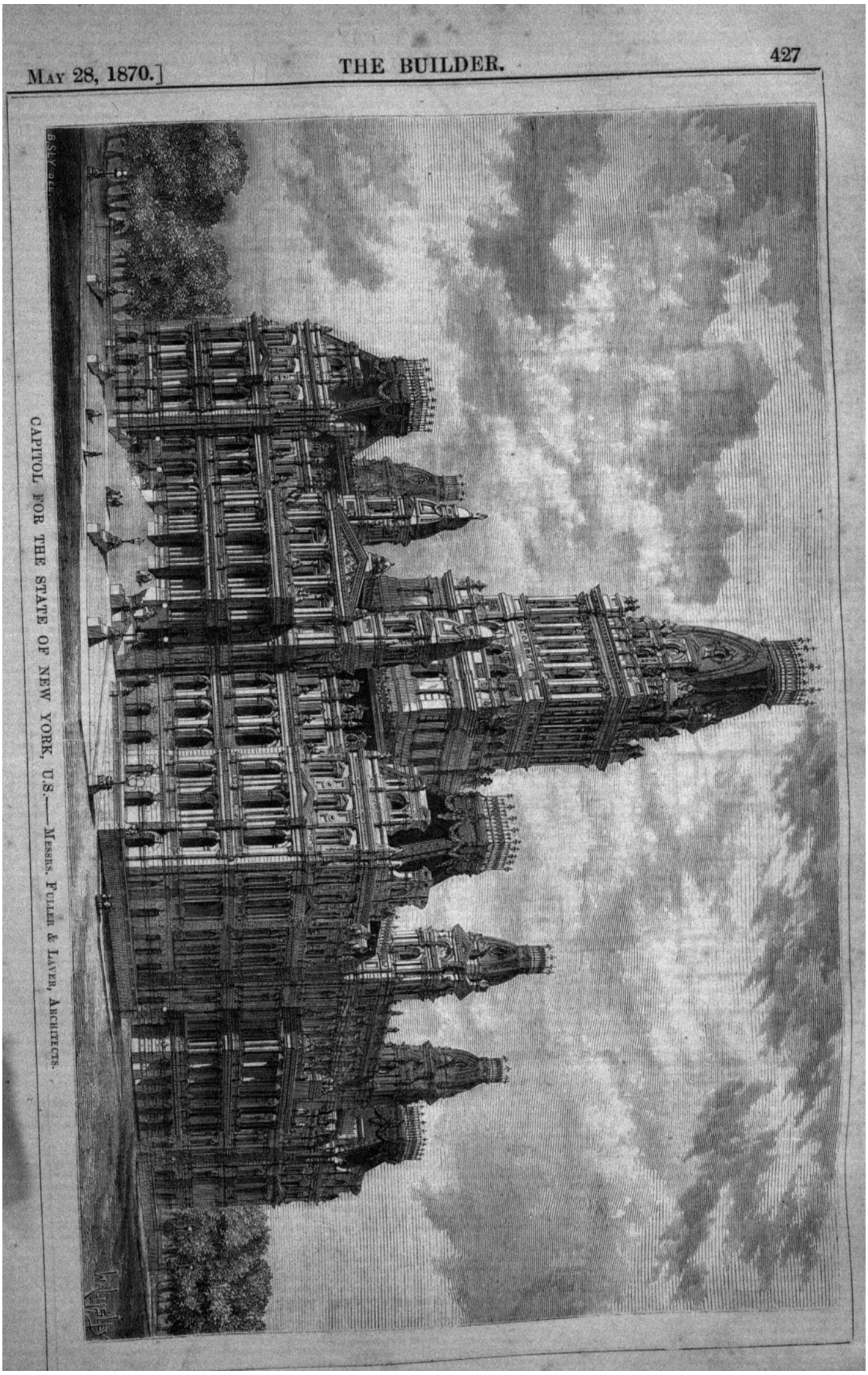


NEW STATE CAPITOL AT ALBANY, NEW YORK.

Plan of Ground Floor.



CAPITOL FOR THE STATE OF NEW YORK, U.S.—MESSRS. FULLER & LAVER, ARCHITECTS.

SCIENCE FOR THE PEOPLE.*

THIS volume, in its sub-title, is called "a memorandum on various means for propagating scientific and practical knowledge among the working classes, and for thus promoting their physical, technical, and social improvement." It is "addressed to Lord Henry Gordon Lennox, M.P., Chairman of the Council of the Society of Arts."

Mr. Twining here gives an account of his varied progress in teaching the working classes useful knowledge, and adds some considerations respecting the general system of elementary and industrial instruction which he conceives to be wanted by these classes in this country, and in which educational facilities, like those he is engaged in organising on a small scale, might acquire a full development.

Mr. Twining says in the outset that he has,—

"Felt all along that the most practically useful lessons would be those taught by permanent collections, organised on more strictly educational principles, so that one might not only see the things to be adopted or eschewed, but learn at the same time the 'reason why.' It was in this spirit" (he adds) "that I began in 1856 to form the permanent and educational exhibition of the things appertaining to domestic and sanitary economy, which from its being devoted to the furtherance of what may be called Economic Knowledge, has taken the name of Economic Museum.

It is to the various modes of diffusing this Economic Knowledge among the people that the following pages are chiefly devoted. To attempt to compass it with a precise definition would be to deprive it of the elasticity of circumscription which enables it to promote man's physical well-being under the most varied circumstances and conditions of life; but it may be briefly said to embrace in this essentially utilitarian direction everything that every one would say that everybody ought to know. Thus it is of unquestionable importance for all classes of society, and especially for those whose income is small, to know how their dwellings should be constructed in accordance with sanitary principles; what household improvements they may derive from the discoveries of science, or borrow from the customs and appliances of other nations; what fabrics they should wear; what food they should eat, and how it ought to be cooked; how they may distinguish things which are genuine, wholesome, substantial, durable, and really cheap, from those which are cheap only in appearance; and, in short, how they may live with judgment, and get the best money's worth for their money.

* * * *

To make it more clear that Economic Knowledge ought to include these scientific elements as well as their practical applications, I sometimes call it Economic Science, or substitute the more comprehensive expression of Science of Common Life; but a title which I shall take the liberty of adopting more frequently, having obtained for it the sanction of eminent scientific friends, is Practical Bionomy, which indicates more clearly the union of Science and Common Sense for our practical guidance in daily life.

What I have found to be the greatest bar to the diffusion of sound principles of Domestic and Sanitary Economy is the almost total absence of preparatory knowledge; nay, of all scientific training among the bulk of the community at large, and the consequent want of ability on their part to enter into the *rationale* of the merits or defects either of the things now in use, or of those proposed as substitutes. An artisan and his wife visiting the admirable Food department of the South Kensington Museum may be struck and interested amazingly by some of the sensational illustrations and labels; but they are so much at sea in all that relates to the chemistry of nutrition, that they would scarcely venture to alter one item in their daily fare in accordance with a scientific dietary. They feel, indeed, as would feel many a classical scholar if he were invited to ramble through field or forest with a botanical work on the Fungi, and to feast on a variety of mushrooms he had never touched before. He would thank you for the suggestion, but prefer sending for the old article to the old shop."

In speaking of free popular lectures on the science of common life, organised in connexion with the Twickenham Economic Museum, Mr. Twining states that his experience of four seasons is decidedly in favour of free admissions. On two or three occasions he has, in order to conform to the practice adopted at certain institutions, or by way of experiment, consented to a charge being made for reserved seats, or to the levying of a penny on non-members; but the result has been invariably unsatisfactory. The amounts obtained by this means have been insignificant, the attendance has been diminished, and as for orderly behaviour, that of the free audiences could not be surpassed.

In his remarks on practical bionomy, or the science of common life, as a part of primary education, the author says that his scheme (in which he includes the education of girls) calls for a specially trained host of teachers, male and female, not conspicuous for their proficiency in one science and their ignorance of the rest, but possessing a well-selected and well-arranged assortment of scientific knowledge, elementary and applied, embracing the whole of the normal requirements of common life.

The volume contains an account of Mr. Twining's experiments at the Lambeth Baths, and remarks on science as a part of technical instruction; on the educational wants of our artisans, and other important subjects; together with appendices, containing a synopsis of the Twickenham Economic Museum; a programme of popular lectures; suggestions for a district museum; and other supplementary notes.

* By Thomas Twining, Vice-President of the Society of Arts. Goodman: Strand. 1870.

EARLY ARCHITECTS IN BATH.

IN the course of a paper, by Mr. Irvine, "On Recent Roman Discoveries in Bath," recently read there, the writer said:—

Some information from the minutes of the Corporation may not be out of place here, relative to the Royal Baths and Pump-room. From these minutes I find that although Mr. T. Baldwin had been for some years connected with the Corporation as their surveyor or otherwise, yet it is only on the 3rd of October, 1791, that he is directly elected as their "architect and surveyor," at a salary of 105*l*. Scarcely do we gaze on the water of the King's Bath, and see its gas bubbles reach the surface, ere they flicker in the sunlight and are gone. Alas! on the 26th of the same month in the same year the records show an order for Mr. T. Baldwin to deliver up all books in his custody, or have a bill in Chancery filed against him. In the minutes for the next year (1792), 11th June, the new private baths and dry pumps adjoining the King's and Queen's Baths are reported as fit for use. And on the 10th of July of that year we learn the fate of (the, I am afraid, stubborn and unfortunate) Mr. Baldwin. "Resolved that Mr. T. Baldwin of this city, surveyor, be discharged from any future employment under this Corporation, and the Town Clerk to file a bill in Chancery against him, to make him deliver up all the books, papers, and writings belonging to the city in his possession." We may doubt whether Mr. Baldwin's plans of any discoveries had much chance of preservation among his warring litigants. Besides this other minutes show that more than one person was connected with the work of, it would seem, not only the Pump-room, but also even the private baths, usually considered the work of Mr. Baldwin; for in the minutes for the 13th of September, 1793, one of the articles to be considered is a letter from Mr. Reveley to the Mayor, offering his services as architect to the Corporation, and containing also a demand for making drawings, plans, and elevations for a new pump-room and baths. There not having been enough members present to form a hall, it is taken into consideration on December 10th, 1793, and the order is given that he is to be paid 27*l*. 9*s*. 6*d*. for his drawing-plans of the baths and pump-room. But this still does not exhaust the catalogue, as we find the Corporation committee who had to do with it requested on, the same day, to consult Mr. J. Palmer, the architect, upon the subject of finishing the said building. And the Committee's report, together with Mr. Palmer's plans and elevations, are produced on the 7th of January, 1794, and agreed on; and in October, 1795, considerable amounts are agreed to be paid to him on account of it.

THAMES EMBANKMENT.

THE railway being now nearly ready, together with the stations, great exertion is used to complete the paved footway and to prepare the carriage-road for public use soon after the opening of this line to Blackfriars in the month of June. The station at Westminster Bridge being open, is connected with the line along the Embankment; the next at Hungerford Bridge; then at Norfolk-street, called the Temple Station; and lastly, for the present at least, at Blackfriars Bridge: thus dividing the distance in three nearly equal parts. This will be a wondrous accommodation to the public in general, and especially to the residents of the S.W., the W., and N.W. districts. So soon as the extension is opened to Bread-street-hill, much additional accommodation will be afforded.

Now that the noble quay walls and landing-piers are finished, what cause most concern are the dingy and desolate aspect of the reclaimed foreshore, and the dread that the long intervals now exhibiting old ruinous stables, store-houses, and wharfs may not be occupied by buildings and façades suitable to the fineness of the site.

The river bridges, save those of the railways, are grand; the Houses of Parliament and the opposing reach as far as the Bishop's Palace, together with the range of seven hospital palaces, give dignity to the Westminster end; but the fine old achievement of Somerset House now shows out in superior lustre, and seems to demonstrate the sort of elevation that is most appropriate to a riverine frontage. The interval between this and the Temple ought to be filled up with some design of a character suitable to the situation, with a frontage of about 300 ft.

Then comes the long space between Waterloo Bridge and the vast Hungerford Station deformity. To make a garden of such a sunken mud waste would be simply ridiculous,—a wide and healthful promenade, flanked by varied buildings, but *not in street allineation*, is all that is needed,—space sufficient for an ornamental range of limes or planes ought to be left; but beyond this any small hortulan reserve in such a position would be only a nuisance.

The last and most valuable plot is that between Hungerford and Whitehall; and here the same treatment should be observed;—opening out and extending Whitehall-place, together with Scotland-yard, leaving space for shade trees, as on the Parisian Boulevards, with seats at suitable distances. This would be a solace on the important Mall of the river; but gardens without shrub or flower would here become the resort of vice and obscenity. The site is most valuable for first-class houses, but the worst possible as a playground of children, who have the shade and picturesque shrubbery of St. James's Park so near at hand.

T. H. H.

CONVICT LABOUR.

ON reading your very sensible remarks on the utilisation of convict labour, in your issue of April 23rd, it occurred to me that you might possibly be interested in learning that the work executed by convict labour at Woking was the *whole* of a prison, to contain 750 females, which, with the houses for the officials and all necessary offices for the prison, including two chapels, laundry for 300 women, bath-house, hospital, rain-water tanks, deep well, 10 ft. in diameter, &c., was built entirely by convict labour.

I was employed as the foreman or superintendent to carry out this work, and, as you may suppose, found great difficulty in starting; but, am pleased to say, brought the work to a satisfactory conclusion, the time occupied being three years and a half, and the cost of materials being about 32,000*l*. I am quite sure the work will bear favourable contrast with work executed under contract; and during the whole time I was in the employ of Messrs. Cubitt & Co. I can truly say I never saw better workmanship.

I am now transferred to Pentonville Prison, for the purpose of making some extensive additions by convict labour also.

J. C. RADFORD.

THE INNER CIRCLE RAILWAY.

SIR,—The Mansion House Railway Station is a mistake, and is not really in the interest of the company or of the public; certainly not of the public.

One of the favourite ideas of the late Duke of Wellington was to have Eastcheap and the two Tower-streets widened; he even went so far as to have plans of the necessary widening prepared, and no doubt the plans exist somewhere to this day. No streets in London are more clogged with traffic than these three are: you can walk along them in the daytime faster than you can ride.

Mr. Haywood, the engineer of the Commission of Sewers, in his report to the committee of that body on the proposed Mansion House Station, dwells upon the notion that, in future, railways through very expensive parts of London must be carried out in connexion with street improvements, at the joint expense of the municipal bodies and the companies. Either work is too expensive for one of these to undertake, he thinks: they must do it together. In the matter of the completion of the Inner Circle Railway, it would seem that we may carry out some of the above ideas.

Let the Metropolitan Railway, which has ample funds for the purpose, bring its line in all its fulness to Tower-hill.

Let the Metropolitan District Railway carry its line as far as its funds will allow it, namely, to Queen-street Station.

Let a third company, in conjunction with the Metropolitan Board of Works and the City, widen, and carry a railway under, Eastcheap and Little and Great Tower streets, and part along Cannon-street (which would not need widening), and so fill up the space intervening

between Queen-street and Tower-hill. The sum estimated by the Metropolitan District Company's engineer, as the *net* cost of the line between Queen-street and Tower-hill, is a million and a half, of which amount 200,000*l.* are for works, and the rest for land and compensation. Surely such a sum ought to do a great deal more than merely make a railway less than a mile long.

It seems to me that by the above plan the Inner Circle Railway would be completed, with stations nearly in the places originally fixed on; that the new street to the Mansion House would be saved from destruction; that a much-needed street improvement, the widening of Eastcheap, &c., would be effected at a small cost to the public; and that a dividend to all three railways of a surprising kind would in a few years be certain.

TRAVELLER.

EDINBURGH FLATS AND WATER CLOSETS.

THE Edinburgh City Improvement Trust, the express purpose of which is to improve the sanitary state of the city, has just been engaged in expunging a salutary clause in the articles of sale of certain of their feus, which clause one of the members, Mr. Gowans, had very properly got inserted, to the effect that all water-closets in the flats or floors of the houses to be erected should be ventilated directly into the open air. The reason adduced for expunging this clause is that the builders will not purchase the ground otherwise; but Mr. Gowans states that their chief objection is to another clause as to public-houses. It seems that one lot subject to the water-closet clause has been purchased by an architect, Mr. James Connel, and another by a builder; and we do not at all see why the builders should hold it to be a vital objection that they will be obliged to ventilate the closets directly into the open air. The arrangement whereby such closets occupy the centre of the dwellings or the common stairs, and not the backs of the houses, is a very bad one, and the arrangement can be easily remedied by a change of plan.

THE ARCHITECTURAL MUSEUM.

THE Report of the Council about to be issued states that the Council are now negotiating with the Royal Academy for an exchange of Classic for Gothic work; and with the South Kensington Museum for the loan of nearly 500 casts from Amiens and other places on the Continent and in this country, in return for casts from the Bartle-Frere Indian sculptures belonging to the Council; that the formation of a library of reference for students and art-workmen has been determined upon, the sum of 10*l.* towards the necessary fittings, and some valuable works having been already promised by Mr. Henry Vaughan. It is hoped that other donations in books or in money for their purchase will follow.

It refers with gratification to the formation of the architectural art classes, under the direction of a joint committee of the Royal Institute of British Architects, the Architectural Association, and the Architectural Museum; each body contributing as it is best able: the Institute in funds and influence, the Association in the working arrangements, and the Museum in giving up a large and well-lighted room and the use of its collection. Too much cannot be urged in favour of this organisation, embracing, as it does, classes for,—

1. Drawing from the flat and round.
2. Drawing from the life.
3. Modelling.
4. Colour Decoration.
5. Water-colour Drawing.
6. Perspective and Sciography.
7. Architectural Drawing.

The past year has been one of unusual expenses, necessitating, the Council regret to say, the sale of 200*l.* of their 300*l.* Exchequer Bills, to meet the deficiency in the income; but even under ordinary circumstances it is believed that the income from every source will not yet meet the bare necessary outlay for keeping the Museum open, to say nothing of additions to the collection, lectures, prizes, &c., for which no steps can as yet be taken.

As regards the Building Fund, 1,000*l.* are still due to the contractor.

The Council have been in communication with the Commissioners for the Annual International Exhibitions of Art and Industry, and have made suggestions for co-operating with them. The council say they are at a loss to understand the absence of their president's name on a commission which includes the presidents of the Royal Academy and the Institution of Civil Engineers.

"IMPROVEMENTS."

UNDER the portico, crouching in fear and dread,
Starving, and not knowing whereon to lay his head,
See you an artisan, homeless and cast away;
See you a man whose vigour has pass'd away:
Once he was young, and could labour like other men,
And often and often befriended his brother men:
Pass him by, pass him by, death is the doom for him;
The City's improving, and there is no room for him.

Under the elms, on the damp turf near Rotten-row,
Sleeping lie mother and infant—forgotten now,
Pallid and scant of dress, though once in silk and lace;
Beauty was hers, and it still lingers in her face.
Husband she's none; but why need we tell the tale?
"Crush'd 'neath the train," on the cold rigid iron rail.
Pass her on, pass her on, life has but gloom for her:
The City's improving, and there is no room for her.

Under the driving sleet, in the square, singing on,
Creatures are moving, and still to hope clinging on;
Wistful they look, but from window or broadway now
Sympathy recks not these sights on the roadway now.
It came not through fever and plague that were burnt out,
But a home tumbled down, and a family turn'd out.
Pass them by, pass them by, darkness must loom for them:
The City's improving, and there is no room for them.

Palace grounds, public squares, wall'd park and promenade,
Though common to many, must not be a *common* made;
Rangers and watchmen have duties, though out of sight,
Known to the homeless who have to sleep out at night.
"The foxes have holes," and the birds have a nesting space,
But God's poor, like Christ, are scarce left a resting-place.
Out with them, out with them, into the tomb with them:
The City's improving, and there is no room with them.

C. C. H.

WATERING STREETS.

SIR,—Will one of your correspondents inform me of any better mode of street watering than by horse and cart, such as hose and jet, &c.? If so, where?

BOROUGH SURVEYOR.

TENDERING.

SIR,—I beg to be allowed to confirm the letter on this subject, which appeared in a recent number.

The unfairness and unsatisfactory manner of the present method of deciding contracts is well known to all contractors. We may pay for specifications, for drawings, and for quantities, and go to much trouble in making out estimates. We send them in, and hear no more of them than if they had vanished into vacuum. No man grumbles at being beaten in a fair fight; but not to have a line of acknowledgment, much less any intelligence as to the result, after our trouble and expense, is very unfair. I have, indeed, often written for the information without getting a word in reply. The system wants amending altogether.

CONTRACTOR.

NEGLECTED APPRENTICES.

SIR,—I am pleased to see that in your last pages, "A Builder's Son," has opened this question. I hope that the subject will not be dropped until some practical remedy has been at least suggested, which will supply willing apprentices with the means of improvement; and at the same time encourage the indifferent towards exertion.

In this matter I think that it is the duty of masters to lend a helping hand. It is an old saying that "boys will be boys," and I think that they have a right to be boys, at least occasionally. That being the case, I ask, is it fair or reasonable to expect a boy to work, say for ten hours a day, and then for him to feel disposed to study technical details? The fact is, many of them have to rob themselves of needed recreation, by learning the "all-important three R.s" in an evening school.

Now, if there be any real desire on the part of master builders to improve their apprentices, the thing is easily done by incurring a little expense; but I fear that "there is the rub." Will they incur any expense? To me it appears that as long as boys,—ay, and men, too,—are tired with their day's work, the majority of them will have but small desire for study after it. Therefore I would suggest that where it is practical, the boys should be allowed a couple of hours for two days in the week; in which time they might study or practise the details of their trade, with the occasional guidance of the foreman, or some qualified person. If this were done, much improvement might be effected, and that before technical schools will have become plentiful. I am one who, as an apprentice, had to struggle against

NEGLECT, IGNORANCE, AND POVERTY.

MANAGEMENT OF THE BRITISH MUSEUM.

SIR,—I am pleased to see the management of the British Museum discussed in the *Builder*, and wish to give my testimony, the result of more than twenty-five years' experience, on certain points, some of which have been debated at different times,—I am sorry to add, with little good result.

The most important matter is the seven days' dead lock every four months. In my case, and doubtless in many others, the result is two or three weeks' imperfect progress in whatever I may have in hand; the train of thought being broken off, and every appliance having to be hunted up afresh. This interruption has sometimes been so serious in its consequences that the previous work has been lost, and the matter dropped altogether.

The ventilation of the reading-room is most defective; usually from about twelve o'clock, or from any time when the room has filled, there are but few, I venture to say, who do not find themselves often overcome by the inclination to sleep, caused by the excessive impurity of the air. Some constitutions are affected by this condition of the air much more than others, and some to a most painful degree.

A printed catalogue of books of reference in the reading-room was published in 1859: changes in these books are, of course, inevitable; but, I think, an interval of ten years is the extreme limit of time which should be allowed to elapse before a new edition is printed. The volume of this catalogue at present in use in the reading-room is illustrated with an unsightly, dirty, troublesome mass of MS. corrections.

Lastly, the school-room element is much too strong in the reading-room. If the present rate of increase in the number of readers continues, three or more such rooms will soon be necessary.

JULIUS.

ARCHITECTS' ACTIONS.

SIR,—Under the above head, the *Builder* last week mentioned a Chancery suit between Mr. C. J. Richardson and Mr. Whatman, as being "decided in Mr. Richardson's favour, after a very short discussion." As this conveys, although no doubt unintentionally, a wrong impression, you will, I trust, allow me also in your next number to state what took place.

Mr. Richardson disputed his agreement with me, and on this being arranged, the only question before the court was, whether any profit had arisen. The sale of the buildings will ascertain this, and if there be a profit, the plaintiff will receive a per-centage of it, and if there be no profit he will have to pay the costs. In short, I have every reason to be satisfied with the decree, and may with truth say to the plaintiff, "Heads I win, tails you lose."

THE DEFENDANT.

THE STALYBRIDGE PUBLIC BATHS.

THE public baths, built at a cost of 6,000*l.* and presented to the inhabitants of Stalybridge by Mr. and Mrs. Robert Platt, of Dunham Hall, are opened: the gift was formally accepted by the Mayor and Corporation of the borough. The baths stand at the east end of Church-street, and have been erected by Mr. Storrs, of Stalybridge, from designs prepared by Messrs. Paull & Robinson, architects. They consist of swimming baths, private baths, Turkish baths, with dressing-rooms, and the building also includes a residence for the bath superintendent. There are two swimming-baths, one of which is not yet roofed. The covered swimming-bath has a water area of 60 ft. by 25 ft., and the building itself is 70 ft. by 40 ft. inside measurement. The open bath has a water area of 82 ft. and 28 ft. Four semicircular trusses on ribbed principals support the roofs. The dressing-rooms, which are arranged along the sides of the baths, have been admirably fitted up and furnished. Galleries are erected over the dressing-rooms for the use of spectators during swimming matches. The water supply is directed from the town's mains, through a 3-in. meter, which will accurately register the quantity used. All the heating powers are furnished by a powerful steam boiler which is placed in the rear of the main building.

CAMBERWELL CHARITY ESTATES COMPETITION.

A CORRESPONDENT, Mr. Dawnay, states that the design sent in by the local surveyor to the charity has been pronounced the best, and possibly is, but complains that he had access to materials shut up from other competitors. He submits that the Vestry should either have employed the trustees' surveyor, or intimated to him that he could not be permitted to enter the competition, and calls upon the vestry to refer the matter to an architect.

THE DRAINAGE OF TOWNS.

BY the existing combined system of house and surface drainage, the pernicious gases which are engendered in the general network of house drains and sewers, escape continuously through the various inlets into the houses and streets all over the town. In this manner the entire atmosphere at and near the surface of the ground becomes polluted; and, as the inhabitants constantly live in and breathe this atmosphere, a depressed state of health and a high death-rate are the inevitable results.

Having regard, therefore, to the question of how best to maintain the purity of the atmosphere of towns, it is to be hoped that the present sanitary commission will extend its inquiry into the first principles of town drainage; that is, whether it is proper that the refuse or house drainage, and the rainfall or surface drainage, should be carried away by one set of drains and sewers, or by two separate sets, namely, one for the house drainage, and the other for the surface drainage. In other words, is the atmosphere of towns as pure, or is the health of towns as perfect,

by discharging the combined house and surface drainage by one system of drains and sewers, as it would be were both kinds of drainage kept distinct, and discharged by two separate systems? This question, which goes to the very root of the health of towns, has never been inquired into, or considered by previous sanitary commissions.

As a system of main pipes of iron laid under the streets, with branch pipes of iron or lead, laid from the mains into the houses, supplies the houses with water, why cannot a similar system of iron piping, only larger, with trapped inlets at the kitchen and scullery sinks, and waterclosets, and properly-arranged ventilating pipes carried above the house-tops, in connexion with the chimney-stacks, be laid so as to take the house drainage clean away into the country for distribution on the land, by irrigation or otherwise? The subsoil would be thoroughly drained and kept dry, and the rainfall, or surface drainage, would be conveyed away, by separate permeable house-drains and sewers connected with the natural water-courses and rivers. This plan is eminently practicable; and, if properly arranged and constructed, would work perfectly under good management.

After all the improvements that have been effected in drainage during the last twenty years, its condition is such even now, that were it to be uncovered and exposed to public view, it would not be allowed to remain as it is for another day without the inauguration of an entirely new system. But as the eye of the public does not see it, its heart does not grieve about it, and so the vile net-work of abomination under the surface will be suffered to go on poisoning the stratum of air in which we live and breathe as it has hitherto done. In the case of polluted streams and rivers which are uncovered and seen, the public are active enough, but in the case of reeking drains and sewers, which are covered and unseen, the public are passive from ignorance of their true condition.

Having had as much practical experience in town drainage as most men, I unhesitatingly declare that the present system is radically wrong; that no improvement in the form and construction of the drains and sewers, and no increased water supply, will thoroughly remedy it; and that the separate system must ultimately be adopted. By its adoption the many evils consequent upon that which is now in vogue would cease, the atmosphere would be purer, the populations would be healthier, and the death-rates would be lower.

JOHN PHILLIPS.

CHURCH-BUILDING NEWS.

Saltash (*Cornwall*).—St. Nicholas's Chapel has been restored and re-opened. In commencing the work the whole of the flooring, except the south transept, was removed and excavated to a depth of two feet. Any vaults that were reached at this depth were filled in and covered with stone, and the whole was then covered with a layer of concrete. The aisles are laid with Maw's tiles on the concrete, and the flooring of the pews is of wood, raised a step above the aisles, and with a space of 15 in. between it and the concrete. The old high-backed pews have been replaced by open seats of pitch pine, varnished. The walls have been replastered. An arch in the north aisle, covered with plaster, has been cleaned off, and the Polyphant stone exposed. The windows have been put in a state of repair, and have been reglazed with cathedral glass. Two new windows, with Portland stone mullions, the gift of the late incumbent, Mr. Hawks, have been erected in the south side, and a small plain Norman window of Polyphant stone, discovered in the south side of the chancel, has been opened out and filled with stained glass by Mr. W. Littleton, in memory of a brother. The ceiling has been replastered between the ribs, which have been painted blue. A new reredos has been erected in Bath stone and marble. The carving has been executed by Mr. H. Hems, of Exeter. Messrs. Ambrose & Snell, of Plymouth, were the architects for the restoration, and Mr. Shaddock, Saltash, the contractor.

Burnham.—At an influential meeting of the parishioners resolutions have been passed for the repair and improvement of the parish church, by partial repewing and rearrangement of pews, supplying new windows, &c.; the means to be obtained by borrowing in the meantime, the meeting pledging itself to repay by instalments. A committee has been appointed to carry out the object of the meeting.

Nottingham.—A new mission chapel has been opened at Kensington, near Nottingham. It is capable of seating nearly 300 persons, a school-room in the rear being so arranged as to admit of its being thrown open to the chapel when required. The chapel is brick built, with stone dressings. The windows are narrow and semicircular-headed, excepting that in the upper part of the principal front, which is a cusped rose-window. The builders were Messrs. Warner & Son, of Ilkeston; and the architect, Mr. Tait, of Leicester.

Blechingley.—St. Mary's Church has been re-opened after restoration. The old plaster has been removed, and the oaken timbers of the open roof restored to view. Where the walls were in a state of disrepair they have been made perfect; the windows are now in their original condition; the old organ-loft has been taken down, and in its place room has been provided for the parish children. The western arch has been enlarged, and the rails of the Clayton monument set back some feet so as to afford more room. All the old high-backed pews have been removed, and in their places are open oak benches, while a stone pulpit, in harmony with the rest of the building, has been erected. A new window, by Messrs. Clayton & Bell, of London, has been put up in the chancel. The restoration was done under Mr. Pearson, of London, architect; and Mr. Carruthers, of Reigate, carried out the work, at a cost of 1,740*l*., and of 400*l*. for restoring the chancel, the rector, the Rev. F. C. Chawner, being at the expense of the latter work.

Lichfield.—The "Lonsdale" Memorial Church, or parish church of St. Mary, Lichfield, has been re-opened. The death of Bishop Lonsdale happening at a time when the church was greatly in need of repair, the suggestion was made for the rebuilding of the nave and chancel as a tribute to his memory, and as the sum of 4,000*l*. was offered in great part by his son, the present vicar (the Rev. Canon Lonsdale), the suggestion was adopted, and the old church was closed in April, 1868, previously to its demolition. The design of Mr. James Fowler, of Louth, a native of Lichfield, was selected from a numerous competition. The style is Gothic, of the Geometric period. The height of the nave,—viz., 60 ft.,—is a feature: its length is 70 ft., by 28 ft. in width. It is an arcade of four bays, having eight two-light traceried clearstory windows on each side. The aisles are 90 ft. by 19 ft., and 21 ft. in plate, finished on the exterior with a moulded line of a parapet and hooded buttresses. At the east end of the chancel and aisles the buttresses are carried up, forming solid spine-pinnacles. The chancel is 30 ft. by 24 ft., and 55 ft. high. By opening out the tower arch and thickening the wall, an effect from the east end of the church has been produced. Owing to the insecure state of the tower, considerable expense has been incurred in bracing and raising the bells, and restoring the interior. Accommodation is now provided for nearly 1,000 persons, and the total cost of the rebuilding is from 8,000*l*. to 9,000*l*.

Lulworth.—A new church has been consecrated at West Lulworth. The foundation stone was laid about twelve months ago by Lady Selina Bond, and the building has been erected under the superintendence of Mr. G. R. Crickmay, of Weymouth, architect, the original plans having been prepared by the late Mr. John Hicks, of Dorchester. The work was begun and carried out, according to Mr. Crickmay's detailed drawings, by Messrs. Wellspring & Son, of Dorchester, builders. The old church was in a very dilapidated condition, and its satisfactory restoration was pronounced to be impossible. The new site is on open ground, about three-quarters of a mile to the west of the present churchyard. The plan comprises a nave, chancel, north aisle, transept, vestry, and tower, the latter standing in the westernmost bay on the south side, and its base forming a porch to the chief entrance. The whole of the design is carried out excepting the two upper stages of the tower. The style is Geometrical. The carved, moulded, and highly finished portions of the stonework generally are of Bath freestone, the remainder being that of the neighbourhood. The roofs of the nave and aisles are open-timbered, moulded, and varnished. The seats are of open construction, and slightly sloped. The chancel roof is of less open construction than those of the nave and aisles. It is hexagonal in shape, the angles being marked by moulded ribs. The sacrarium floor is laid with encaustic tiles, the steps and footpace being of polished Purbeck marble.

Morden.—The rebuilding the old church of East Morden has been commenced, the corner stone of the new structure being laid by Mr. J. S. W. S. Erle-Drax, M.P. for Wareham. The old edifice was fast falling into ruins. Miss Drax has undertaken to bear the cost of the new church, which is estimated in round figures at 2,000*l*. The reconstruction was undertaken by Mr. Joseph Seller, builder, who has already carried out some works for Mr. Drax. Mr. Nichols is foreman of the works. In the old chancel was an ancient stone monument to the Erle family, the ancestors of the present squire. This monument has been removed, and the pieces forming it are being preserved in a large wooden case and placed in a building near the site. In making the excavations the workmen discovered a couple of carved tombs of Purbeck marble, but bearing no date. These were under the foundation of the porch, and it is thought that on the same site there stood a church even before the old building now razed to the ground. Some mural inscriptions, stone arches carved, &c., were also found. While the former building would accommodate 400 persons, the new one is to contain 500 seats. The tower will have, as before, four bells. The building will be of sandstone, and Ham-hill and Tisbury stone, the colours of which,—dark, red, yellow, and whitish,—form a contrast. The style of architecture will be Gothic. There are to be a nave, two side aisles, supported by pillars, a chancel and a vestry at the east end. A chamber for heating apparatus is also to be provided. Including the tower, the building will stand on an area of about 100 ft. by 40 ft. The dimensions of the nave will be about 70 ft. by 20 ft.; the chancel will be 30 ft. by 20 ft., and each of the aisles 40 ft. by 10 ft. At the south end there will be a small gallery for the organ and choir. There is to be an east window of stained glass, and the other windows will be filled in with cathedral glass. The pews will be high ones. The flooring of the chancel and the aisles will be of Minton's encaustic tiles.

Books Received.

Gibbs's Studies for Art Designers and Manufacturers. 14, Pembroke-street, Oxford. 1870. WHEN this work was commenced, the author, Mr. John Gibbs, proposed to publish it in parts, and we gave some particulars when the first was issued; a desire, however, was expressed, it seems, that it should be published as a complete work at once, and this has been complied with, by the production of thirty-one large plates and some introductory remarks. The author holds an opinion which is not new in these pages, that our own Romanesque affords an excellent basis for all future architectural and decorative development. He urges that the historical and archæological associations of this style, which has several co-equals, in beautiful correspondence, in France, Germany, and Italy, may be studied with great advantage, and should be so studied with other styles; and that a complete knowledge of the laws and rules of proportion, harmony, and fitness should ever be the companions of the architectural or the designing genius. With such knowledge and taste much more may be achieved in architecture and ornament than copyists can have any idea of, and he would be as conservative as any of the best of the reproducers did he not hope and believe in the development of the style he has quoted; and for this purpose the original mind will not only grasp all that is lovely, and strong, and enduring, that can consistently be gathered from all the fields of art, past and present, but he will call to his aid many of the natural objects which grow and blossom in our fields and gardens,—ay, and in other lands, too,—that the beautiful, the true, and the lasting may be brought together proportioned into the majesty of order, the dignity of usefulness, and the harmony of repose.

"The study of decorative art," says Mr. Gibbs, "is too much neglected by most architects, and is consequently left too often to those whose duty it should be to manipulate the ideas of the designer. Every architectural pupil should study decorative art. As much as possible he should be a master in his profession, and have a practical knowledge of every trade dependent upon it. The author desires to urge the study of decorative art upon all those students of architecture who are likely to succeed as such on account of their natural abilities and energies, for they only will maintain the principles of high art, and originate new forms accordingly. They will find it more a matter of joy than difficulty, and certainly advantageous in other respects. The love and power of decorative art in all its varied forms, is now more than ever exemplified by the thousands of amateurs who practise it. To talk learnedly

of art; to draw, paint, execute sculpture and carving, work tapestry, and much else, even to the using of the jack-plane and the laying of tiles, are things great amongst the many instructive and interesting pursuits so extensively practised by many of the sons and daughters of England, yet only for the pleasure they yield. And the more the principles of design are understood by society generally, so much the sooner will our public and private buildings become works of high art."

Some of our best buildings, it is quite true, have been disgraced by impure and tasteless and badly-executed decorations, simply because in these instances the study of decorative art has been neglected.

The designs before us include capitals, chimney-pieces, foliage, ornamental bands, diapers, panels, wall decorations, a reredos, and two portions of a supposed building, designed to show the applicability of the Romanesque style to modern purposes. They are boldly and skilfully drawn, Mr. Gibbs being an excellent draughtsman, and will make capital copies for schools of design and similar establishments. Beyond this, however, as decorative designs they will be found to afford many very valuable hints to art workmen. We shall hope to find that the author has been repaid for his large outlay of time, thought, and money.

A Description of the Roman Tesselated Pavement found in Bucklersbury; with Observations on Analogous Discoveries. By JOHN EDWARD PRICE, Director of Evening Meetings of the London and Middlesex Archæological Society. WE are indebted to the Library Committee of the Corporation of London for this very valuable contribution to the history of Roman London. Mr. Price, with pains and skill, has brought together a very large amount of information, not alone as to the pavement in question, the discovery of which we noted at the time, but concerning previous discoveries of a similar kind,—Walbrook and London Stone. The volume is illustrated with a chromo-lithograph, on a large scale, of the Bucklersbury pavement, and numerous woodcuts. The writer acknowledges his obligations to Dr. W. Sedgwick Saunders, the chairman of the Library Committee, to whose energetic action the success which attended the efforts to preserve the pavement is mainly due.

Index to Vols. II. and VIII. of the Series of Records known as the Remembrancia: preserved among the Archives of the City of London. Prepared by the authority of the Corporation of London. HERE we have another good result of the intelligent liberality of the Corporation of London. The series of books known as the "Remembrancia" consist of nine volumes, embracing period from 1580 to 1664, and include copies of correspondence on many matters of interest. Thus, under the head of BUILDINGS, we get—

"No. 17. Letter from the Lords of the Council to the Lord Mayor, to prevent the erecting and overcrowding of small tenements within the City, and for the aldermen and their deputies in the various wards to make search, and in cases of overcrowding to remove the inmates, according to the statute lately passed for that purpose. 5th October, 1593.

No. 190. Letter from Lords of the Council to the Lord Mayor and Aldermen, requiring them to put into execution her Majesty's late proclamation against the erection of *new buildings*, and divided tenements, and for committing to prison all persons found transgressing the said proclamation. 11th July, 1602.

No. 261. Letter from the Lord Mayor to the Lords of the Council, with a return as ordered by them, of the new buildings lately erected and now being erected in the City and suburbs, contrary to the order of their lordships and the Star Chamber. 26th March, 1606.

No. 354. Letter from the King (James I.) to the Lord Mayor and Aldermen, congratulating them upon the care bestowed upon the walks of Moorfields, the re-edifying of Aldgate, and the reparation of divers churches of the City, also calling their attention to the state of the steeple of St. Paul's Cathedral, and offering the sum of 500*l.* as a free gift towards the works, if they will take them in hand; and further appointing a commission to inquire into the expenditure of the benevolences given towards the restoration of the cathedral. 24th July (in the first year of his reign), 1603."

We hope that the Corporation will soon find it convenient to direct Mr. Overall, the librarian, to proceed with the work he, in conjunction with Mr. H. C. Overall, has so well begun.

Miscellanea.

Distress amongst the Working Classes. Mr. M'C. Torrens, in the House of Commons, has given notice that on the 17th of June he will move a resolution that the continued want of employment amongst those who live by wage labour in many of the great towns of England calls for the consideration of the House, with a view to devise the best means for remedying the same without delay.

Communication with the Continent.—The Committee of the House of Commons, on group 2 of Railway Bills, Mr. Cross in the chair, has given its decision upon a Bill which has been looked to with much interest. It is called the International Communication Bill, and embodies Mr. Fowler's scheme for establishing a service of railway steam-vessels between Dover and Audreselles, a short distance from Boulogne. Both at Dover and at Audreselles harbours for the accommodation of the vessels, which will resemble floating castles, are proposed to be built. The end of a short line connecting both harbours with the railway would form a hydraulic lift, by means of which a train of 12 carriages could be run on the upper, and 12 on the lower deck of the vessel, which would be 420 ft. long, and 1,600 horse-power. Thus passengers booking at Paris or London could accomplish the whole journey without leaving the carriages. In was stated in course of the evidence that the Emperor of the French was favourable to the project. The committee has decided that the preamble of the Bill has been proved. The operation of the Act is to be restricted until the Emperor of the French has given his assent to the construction of the works, and nothing is to be done under the Act until the whole of the capital is subscribed and half paid up.

Proposed New Infirmary for Leeds.—At a recent meeting of the local guardians, a committee's report on the best system of providing increased accommodation for the sick at the workhouse infirmary was read. It recommended that a new hospital or infirmary shall be built on the pavilion principle, with accommodation in two pavilions for not less than 100 inmates in each pavilion; that the wards be about 120 ft. long, with moveable partition in the centre not less than 22 ft. wide and 15 ft. high, and that not less than 120 cubic feet of space be allowed for each bed; that the windows be constructed with the most improved means of ventilation; that the airing grounds between the pavilions be not less than 100 ft.; that sun-lights be introduced in the various dormitories; that architects submit the most approved plan for ventilating and warming the wards; and so on. The report was adopted, and advertisements ordered to be inserted in the local papers, asking competing architects for plans, and offering two premiums of 50*l.* and 30*l.*; the plans to be delivered or or before 28th June.

The Use of Serpentine for Decorative Purposes.—A serpentine font has just been manufactured by Mr. J. Murphy, of the Serpentine Works, Penzance, and fixed in All Saints' Church, Landport, Portsea. As described by the *Cornish Telegraph*, the font is in the Gothic style. The bowl is octagonal, 2 ft. 1 in. in diameter, and stands on an octagonal plinth and five pillars. The whole is placed on an octagonal white Portland-stone plinth, 3 ft. in diameter. The serpentine has been well selected, and is a beautiful specimen of the Lizard stone. This font has been erected by the members of the congregation as a memorial of Mrs. Churchill, the wife of the Rev. C. B. C. Churchill, rector of the parish. Mrs. Churchill had often expressed a wish to see a font of this kind placed in the church at Landport, and the congregation, therefore, gracefully subscribed for this one after her death, as a memorial of herself. The Portland plinth was given by Mr. Leather, the contractor for the new docks, Portsmouth.

Oxford Architectural Society.—The second excursion for the season of this society took place on Saturday, when the members left Oxford by the Great Western Railway for Banbury, where they arrived at a quarter to three. After reaching Banbury the party walked to Broughton Castle, which was kindly thrown open to them by Lord Seye and Sele. The party assembled on the bridge. Mr. J. H. Parker, F.S.A., called attention to the various points of interest at the castle. The next thing in the programme was a walk to Bloxham, where the party were very kindly received by the vicar, the Rev. J. Hodgson, and Mrs. Hodgson. Mr. Hodgson said that the restoration of the interior of the church cost 6,300*l.* He read a paper on the architecture of the church. At its close the party were invited to the vicarage and partook of refreshments. There was a break in waiting at Bloxham, and the party drove into Banbury, first having a look at the supposed Roman amphitheatre called Bear-garden. They returned to Oxford by the eight o'clock train, having spent a very pleasant day.

Earthwork and other Pre-Historic Remains on the Malvern Hills.—A few weeks ago the Worcester Archæological Club were astonished at an announcement made to them by Mr. Lines, one of the members, of an extraordinary discovery of traces of ancient habitations on an extensive scale on the slopes of the Herefordshire Beacon, and also in connexion with the smaller camps on Midsummer Hill and Hollybush Hill. An exploratory visit has accordingly been made to the *new* field of research; and Mr. Lines read an elaborate descriptive and theoretical paper on the subject at Midsummer Hill, where he pointed out the peculiar character of the ancient camp on that hill, its convoluted entrance, and the honeycombed depressions of the whole crest, the sides being worked into terraces, and concentric rings or hut circles being visible on the east side, overlooking Hollybush Hill. Mr. Lines pointed out an altar in peculiar relationship to certain triangular tanks, which reminded him of Hindu religious observances, and the water triangle of ancient symbolism. An artificial cave in connexion with the remains was also visited, and what he regarded as a tumulus or cemetery; urging its excavation, with permission of the Lord of the Manor, Earl Somers; who, he thought, would feel as deeply interested in these remains as any member of the club could be.

Zinc Poisoning.—Of the dangers of lead-poisoning and copper-poisoning from the improper use, in various ways, of vessels made of those two metals, we have heard enough to make those whom it concerns sufficiently cautious. Zinc must be added to the inculpated list. Mr. E. Kinch, of the Royal Agricultural College, Cirencester, writes to the *Food Journal* that a sample of elder-wine recently came under his notice, which had been found to produce serious vomiting when partaken of to the extent of about eight ounces. The maker had used a clean galvanised or zinced iron vessel, and a wooden spoon to stir the ingredients. On examination the wine proved to contain zinc, dissolved by the oxalic acid of the elder-berries, in quantity nearly equal to nine grains of oxalate of zinc per pint. Milk is well known to attack zinc surfaces, forming lactate of zinc; and a foreign chemist has lately called attention to the fact, that water kept in zinc reservoirs, or collected from zinc roofs, is invariably contaminated with the metal, and therefore should not be used for domestic purposes.

An Electrified Island.—The little island of St. Pierro Miquelon boasts of two telegraph stations. One of these belongs to an American company, which works in connexion with the Anglo-American Company's lines, receiving messages from Newfoundland and sending them on to Sydney. The other station, which is worked by the French Transatlantic Company, is finished with extremely delicate receiving instruments, which were found to be seriously affected by earth currents. It was found, says *Nature*, that part of the so-called earth-currents had been due to the signals sent by the American Company into their own lines, for the messages sent by the rival company were clearly indicated. The wires were not even in close vicinity. The two stations are several hundred yards apart, yet messages sent to one were distinctly read at the other, through the earth. The fact is, the little island was thoroughly electrified, and could no longer keep its secrets.

The American Rubber Stamp.—An American, named Stetson, has invented an elastic stamp made of india-rubber, which is said to be an improvement on metallic or other hard stamps for certain purposes. The design is formed on the india-rubber, and the stamp is useful in cases where metallic stamps would be useless. For example, it can accommodate itself to any irregular form or uneven surface, and can even stamp "round a corner." In proportion to its elasticity is its special value. It does not indent the impressed surface, and produces soft and delicate impressions. The cost is small, and the durability great.

Laws of Conduct.—A course of four lectures "On the Laws of Conduct in Industrial Life, and on the Method of Imparting Instruction therein in our Primary Schools, especially addressed to Teachers," are in course of delivery by Mr. William Ellis, at the Lecture Theatre of the Royal School of Mines, Jermyn-street. The next will be given on Monday, the 30th of May: others will follow on the 13th and 20th of June, at 8 o'clock. Admission free.

The New National Gallery that is or is not to be.—On going into Committee of Supply in the Commons, Mr. Beresford Hope called attention to the delay which had occurred in proceeding with the building of the New National Gallery, and moved for papers and other information on the subject down to the present day. Mr. Ayrton promised the production of papers; but from his remarks, and those of Mr. Gladstone, it appears that the Government have no immediate intention of doing anything further in the matter, giving as a reason the great expense which other and more pressing public buildings are occasioning, and will occasion; special reference being made to the proposed accommodation for the Natural History collection of the British Museum; no promise or information as to procedure in which, however, was made either. Mr. Ayrton included the Law Courts among those public buildings which were to be gone on with at the cost of the Government or the country.

Cost of Metropolitan District Railway. In evidence before a Parliamentary Committee, Mr. Robert Baxter, of the firm of Baxter, Rose, & Norton, solicitors to the company, said the company's line had cost;—The first portion, at South Kensington, 361,000*l.*, of which the land represented 103,000*l.*, expenses, 51,000*l.*, and works, 207,000*l.*; the second portion, from High-street, Kensington, to Pelham-street, 693,000*l.*, and from thence to Westminster, 2,096,000*l.*; from Westminster to Bread-street the cost was 986,000*l.*, of which 556,000*l.* represented land, and 430,000*l.* works; and from Bread-street to Queen-street, 305,000*l.*, of which 210,000*l.* represented land, and 95,000*l.* works. The contractors took originally 750,000*l.*, and secondly 500,000*l.*, together about a million and a quarter of the stock. Was not acquainted with their present holding, but should guess it roughly at about a million.

An Oversight in Compensation.—The *Parochial Critic* says,—A short time ago, Kensington was promised a new police-station. A fine site was obtained opposite the principal line of buildings on the improvement lately made in the High-street. Premises at the corner of Church-court, and abutting on the wall of the churchyard, were bought for 2,000*l.*, and a similar amount was paid by the police authorities for an adjoining house. Now occurred a "hitch." The freeholder of the second piece of property came down with a claim for the extinction of his interest, the awkward blunder having been made of treating only with the lessee. A dismissal of the gentleman through whom the thing came to so absurd a pass is believed to have visited upon him severely the consequences of his short-sightedness.

Hurstpierpoint Town Drainage.—The following are the tenders received for constructing the stoneware pipes, reconstructing the bridge crossing the Cuckfield-road, near the old Toll House, and other works, for draining the town, exclusive (it is believed) of the sewage tanks, &c.:—Cole, Forest Hill, 3,581*l.* 5s. 7d.; G. Harris, Shalford, Essex, 3,159*l.*; Crockett, St. Pancras, 3,155*l.*; Symonds, Redhill, 3,086*l.*; Ford, Wolverhampton, 3,022*l.* 7s. 11d.; Cheeseman & Co., Brighton, 3,020*l.*; Blackmore, Brighton, 2,999*l.*; Bloomfield, Tottenham, 2,995*l.*; Hayward, Croydon, 2,820*l.*; Goodair, Southwark, 2,755*l.*; Young, Battersea, 2,750*l.*; Vickers & Crave, Southsea, 2,747*l.*; Woodcock, Lower Walmer, Deal, 2,644*l.* Mr. Woodcock's tender, being the lowest, was accepted. Mr. B. S. Nunn, of Brighton, is the surveyor; and Mr. Edwin Anscombe, of Hurst, the clerk of the works.

Death of Mr. D. O. Hill, R.S.A.—This well-known artist, who has been long in failing health, died at Edinburgh on Tuesday. Mr. Hill was born, in 1802, at Perth, where his father was a bookseller. In 1823 he exhibited in Edinburgh, three pictures of Scottish scenery, which evinced artistic skill of high promise. In 1830 he was appointed secretary of the new Royal Scottish Academy. He was the first to suggest the formation, and aided in devising the constitution of the Royal Association for the Promotion of the Fine Arts in Scotland.

The Floating Dock "Bermuda."—Intelligence has been received of this dock having been safely floated into the camber or basin of the Royal Naval dockyard, at Ireland Island. Preparations were being made for docking in it her Majesty's ship the *Racoon*.

Portrait of the Prince and Princess of Piedmont.—At the establishment of Messrs. Henry Graves & Co., in Pall-mall, we have seen a very interesting picture, by Mr. Desanges, containing life-size portraits of their Royal Highnesses Umberto and Margherita, Prince and Princess of Piedmont, and their infant son, the Prince of Naples, which is about to be engraved. We hear, with something besides astonishment, that space for this picture was refused by the Council of the Royal Academy. The illustrious personages represented will be King and Queen of Italy, and it seems to us that if the merit of the painting had not been high, the interest of the subject, the likenesses being admittedly good, should have obtained for it a place. We have no hesitation, however, in saying that as a picture it is a work of merit, far superior to many that are hung, and that the painter of it has been very badly treated,—not for the first time. The picture is intended for the town-hall of Naples.

Monumental.—According to the *Kensington News*, the memorial of the late Rev. William Harness, M.A., vicar of All Saints', Prince's-gate, will take the form of a monumental brass at All Saints' Church, and a Harness prize for Shakspearian Literature at the University of Cambridge.—Mr. Nelson, the sculptor, of London, has been commissioned to execute the statue of the late Lord Stanley of Alderley, to be erected in Alderley Church, Cheshire.—The Duke of Devonshire, the Chancellor of the University of Cambridge, has notified that the statue of the late Prince Consort, as chancellor of the university, on which Mr. Foley has been for some years engaged, being now completed, his grace, acting on behalf of the subscribers, makes a formal offer of the memorial to the senate.

Plaster of Paris for Modelling.—When 2 to 4 per cent. of finely-pulverisd althea root (marsh mallow) is mixed with plaster of Paris, it retards the hardening, which begins only after an hour's time. When dry, it may be filed, cut, or turned, and thus become of use in making domino-stones, dies, brooches, snuff-boxes, and so on. Eight per cent. retards the hardening for a longer time, but increases the tenacity of the mass. The latter may be rolled out on window glass in thin sheets, which never crack in drying, may be easily detached from the glass, and take on a polish readily by rubbing them. This material, incorporated with paints, and properly kneaded, gives imitations of marble, can be coloured when dry, and be made waterproof by polishing and varnishing.

Archæological Discovery.—Mr. J. R. Mortimer, of Driffield, has just completed the examination of a tumulus-like mound, situate about one-sixth of a mile north-west of the village of Fimber, on the Yorkshire Wolds. The discovery is of peculiar interest, being only the third of the same cruciform platformed nature yet recorded. The first was made at Helperthorpe, in the Wold Valley, a few years ago; and the second, closely allied to Mr. Mortimer's, was made at Swinton. The mound just examined was known as the "Mill Hill" by the oldest inhabitant. Mr. Mortimer suggests the desirability of a proper record and investigation of places which bear the traditional name of "mill hill," "moot hill," or "cross hill," which are not uncommon. There is a Mill Hill in Middlesex.

The Colour most Striking to the Eye.—Experiments made to ascertain what colours are most quickly and easily perceived by the eye, seem to show, according to the *Photographic News*, that bright yellow is the colour most easily distinguished, and it is therefore suggested for railway signals. It is remarkable that yellow yields dark shades in photographs: thus, a yellow-haired person is apt to have black or dark hair, and yellow dresses never turn out *light*.

Society for the Encouragement of the Fine Arts.—Some of our readers may be glad to know beforehand, that at the next meeting of this Society, June 2nd, Dr. Westland Marston will read a paper "On the Tragic Elements in the Drama of Fiction." On that occasion, appropriately, Dr. Doran will preside.

Free Libraries Act, Derby.—At a public meeting of the ratepayers of the borough of Derby, held in the Guildhall, and largely attended, it has been unanimously resolved to adopt the Free Libraries Act.

Civil Engineers' Conversazione.—The *conversazione* of the President of the Institution of Civil Engineers will take place on the 31st inst.

Glass and the Sun.—M. Bontemps, the managing director of the glass works at Choisey-le-Roi, states that the best and whitest glass made at St. Gobaix turns to a distinct yellow after three months' exposure to the sun. Crystal glass, made with carbonate of potassa, litharge, and silica, was not at all affected (the other varieties referred to contain carbonate of soda); English plate-glass, from the British Plate Glass Company, of a distinctly azure blue tinge, also remains unaffected. The colouration, which begins with yellow, and gradually turns to violet, is attributed to the oxidising effects of the sun's rays upon the protoxides of iron and manganese contained in glass. It is well known, however, that the association of sodium with yellow colours is frequent.

England's Character on the Wane.—A sentence in the last report of the chief engineer to the Great Western Railway of Canada is so significant that we quote it without further comment:—"Very serious defects pertain to a large proportion of all the rails imported from England of late years, and the consequence is that all the leading railways are now either introducing steel rails, or they are purchasing American rails manufactured from a superior quality of native iron."

Demolition for the New City Library.—The destruction of several large buildings on the west side of Basinghall-street, closely contiguous to the Bankruptcy Court, will shortly give opportunity for the foundations to be put in, and the new and extensive buildings commenced. The erections will be fitted for the joint purposes of a library and museum, with accommodation for readers. 25,000*l.* is the amount decided to be conditionally granted for the purpose out of the City's cash.

Proposed New Street through Leicester-square.—Capt. Grosvenor, M.P., and Mr. W. H. Smith, introduced a deputation to the Metropolitan Board of Works last week, praying that body to consider the importance of constructing a new street from Charing-cross to Tottenham-court-road. The proposed new thoroughfare would involve the purchase of Leicester-square, and its gross cost would be about 600,000*l.* The matter was referred to the General Purposes Committee.

Proposed New Church for Wednesbury. Messrs. Elwell, of Wood Green Works, through whose liberality a new church school-room was recently opened at New Town, now propose the erection of a new church in the same neighbourhood, and offer 3,000*l.*, or 1,000*l.* each, towards the cost of the work. The site proposed is in the upper part of Wood Green, close to the cemetery, with a front entrance from the Walsall-road.

Meltham.—The foundation-stone of the new almshouses at Meltham, in course of erection by Mr. J. Hirst, has been laid by Mrs. Hirst, in presence of a large concourse of people, mostly residents in Wilshaw and the neighbourhood. The architect is Mr. Kirk, of Huddersfield.

National Provincial Bank, Birmingham With reference to a recent notice of the New National Provincial Bank at Birmingham, in our pages, we are asked to mention that all the safes, doors, strong-rooms, and linings were made by Messrs. Chubb & Son.

The Proposed New Town-hall for Winchester.—A memorial has been drawn up by those opposed to the scheme of the Town Council for a new town-hall, to be presented, when signed, to the Lords of the Treasury, praying them not to sanction the erection.

The Architectural Exhibition.—The *conversazione* held on Tuesday evening last, under the presidency of Mr. Jas. Fergusson, was fairly attended. A military band was present under the direction of Mr. Bodderley.

New Park for Bradford.—The Bradford town council have decided to accept the offer of Mr. Lister to sell the estate of Manningham Park, valued at 60,000*l.*, for 40,000*l.*, in order to form a second public park for the borough.

TENDERS.

For new residence at Salehurst, Sussex. Mr. G. Beck, architect:—

Bridgeland	£684	0	0
Parks (too late)	647	0	0
Skinner	509	8	4
Baldock & Brooker (accepted)	375	0	0

For new infirmary and alterations to old infirmary, &c., Uxbridge Union. Mr. Shoppee, architect. Quantities supplied by Mr. Sidney Young:—

Crabb & Vaughan	£2,662	0	0
Cullum	2,630	0	0
Reavell	2,626	0	0
Hanson	2,582	0	0
Hailey	2,568	0	0
Goodman	2,493	0	0
Taylor	2,483	0	0
Nightingale	2,473	0	0
Crockett	2,425	0	0
Jackson & Shaw	2,400	0	0
Tarrant	2,397	0	0
Wicks, Bangs, & Co.	2,390	0	0
Willans	2,368	0	0
Hill, Keddell, & Waldram	2,325	0	0
Fassnidge & Son	2,294	0	0
Cooke & Green	2,285	0	0
Kearley (accepted)	2,197	0	0

For a house at Croydon for Mr. C. Fielder. Mr. Alfred Porter, architect. Quantities supplied by Mr. J. Leaning:—

Dove Brothers	£1,295	0	0
Merritt & Ashby	1,273	0	0
Coleman	1,226	0	0
Hart	1,186	0	0
Drake Brothers	1,098	0	0
Marrenge	1,096	13	8
Roborne	1,050	0	0

For repairs and alterations at Spanish and Portuguese Jews' Infant School. Mr. F. Lett, architect:—

Heeps	£263	10	0
King	252	0	0
Nightingale	233	10	0

For china works at Hanley, for Messrs. R. G. Scrivener & Co. Messrs. R. Scrivener & Son, architects. Quantities supplied:—

Bailey	£1,239	0	0
Barton	1,220	0	0

For villa residence for Mr. W. Stubbs. Messrs. R. Scrivener & Son, architects. Quantities supplied:—

Bailey	£1,118	0	0
Bowden	1,059	0	0
Bennett & Cooke	1,050	0	0
Wooldridge	1,040	0	0
Clewes & Ogden	1,038	12	0

For house and shop, Edgware-road, Kilburn. Mr. C Foulsham, architect. Quantities supplied by Mr. Thos. Nixon:—

Carter & Son	£1,593	0	0
Thompson	1,576	0	0
Gammon & Sons	1,531	0	0
Ebbs & Sons	1,522	0	0
Scrivener & White	1,448	0	0
Rankin	1,330	0	0

For rebuilding two dwelling-houses, with shops, lately destroyed by fire, at Bridgwater. Mr. Edwin Down, architect:—

For Mr. Whitby, Bookseller.

Kitch Brothers	£1,178	0	0
Preece	1,120	0	0
Searle & Son	1,099	15	0
Chedgey	1,054	0	0

For Messrs. Moore, Blacker, & Co., Drapers.

Kitch Brothers	£1,470	0	0
Searle & Son	1,451	19	0
Preece	1,400	0	0
Chedgey	1,375	0	0

For finishing four houses in Blackstock-road, Seven Sisters'-road, Holloway, for Mr. J. Fowler. Mr. R. Gover, architect. Quantities by Mr. Shrubsole:—

Sabey & Son	£900	0	0
Bridgman & Nuthall	850	0	0
Mansfield	779	0	0
Guyver	776	0	0
Blackmore & Morley	720	0	0
Cole	698	0	0
Warne	690	0	0
Prentice	680	0	0
Matkin	664	0	0
Newsom	655	0	0
Norman & Son	625	0	0
Pitcher	599	0	0
Reid	596	0	0
Harrison & Edwards	595	0	0
Holding & Dickins (accepted)	587	0	0
Cooper & Mulley	499	0	0
Chapman	495	0	0

For shop and residence at Chertsey, for Mr. Waterer. Mr. Thos. Wonnacott, architect:—

Tulley	£1,675	0	0
Adamson & Sons	1,392	0	0
Goddard & Son	1,322	0	0
Easton Brothers	1,295	0	0
Nightingale	1,216	0	0

For building new premises, No. 56, Bath-street, City-road. Mr. Henry T. Gordon, architect. Quantities supplied:—

Conder	£1,448	0	0
Hill & Sons	1,400	0	0
Bowman	1,377	0	0
Heeps	1,290	0	0
Wright	1,205	0	0
Scrivener & White	1,193	0	0
Perry Brothers	1,127	0	0
Ebbs & Son	1,117	0	0
Blackmore & Morely	1,073	0	0

For forming roadway, Lett's Wharf Lambeth. Mr. J. Tanner, architect:—

Griffiths	£276	0	0
Booth (accepted)	257	0	0
Rutley	255	0	0

For doing certain repairs and alterations to a house at Kingston-on-Thames, for Mr. H. Nash. Mr. John S. Ellis, architect:—

Dolling	£240	0	0

For erecting shop at Loughton, for Messrs. J. & B. Price. Mr. J. Tanner, architect:—

Wells	£408	7	6
Greenaway (too late)	337	8	0
Cuthbert	278	15	0
Egan (accepted)	278	0	0

For the erection of four cottages, New-street, Henley-on-Thames, for Messrs. Harris & Hewett. Mr. Frederic Hasham, architect. Quantities supplied:—

Ayres	£385	10	0
Scott	379	0	0
Clements	367	0	0
Willis	365	9	0
Simonds	354	0	0
Sadler (accepted)	350	0	0

For additions and alterations to Woodside, Caterham, for Mr. Juland Danvers. Mr. Richard Martin, architect. Quantities prepared by Mr. Frederick Sparrow:—

Chappell (accepted)	£870	0	0

For enlargement of St. James's Church, Clapham. Messrs. F. & H. Francis, architects:—

Colls & Son	£5,580	0	0
Higgs	5,135	0	0
Myers	4,878	0	0
King & Sons	4,770	0	0
Dearde	4,766	0	0
Browne & Robinson	4,647	0	0
Dove Brothers	4,255	0	0

For finishing six houses at Friars-place, Acton, for Mr. William Hooper. Mr. Edward Hewett, architect:—

Miller	£1,011	0	0
R. & F. Pargeter	981	0	0
Glover (accepted)	969	0	0

For building warehouse and offices in North-street Mews. Messrs. Gadsden, Ellis, & Scorer, architects:—

Simpson	£675	0	0
Perkins	649	0	0
Sharpington & Cole	555	0	0

For finishing three warehouses on the Charterhouse Estate. Mr. J. Collier, architect:—

Crabb & Vaughan	£1,695	0	0
Cullum	1,498	0	0
Newman & Mann	1,486	0	0
Nightingale	1,333	0	0
Kelly Brothers	1,313	0	0
Sharpington & Cole	1,297	0	0
Kilby	1,283	0	0
Perry Brothers	1,273	0	0

For alterations at 28, Cheapside. Mr. J. H. Rowley, architect:—

Crabb & Vaughan	£418	0	0
Scrivener & White	376	0	0
Becton	360	0	0
Merritt & Ashby	355	0	0
Sharpington & Cole	352	0	0
Shepherd	340	0	0
King & Sons (accepted)	315	0	0

For Preston Police Station. Mr. H. Card, county surveyor. Quantities supplied by Mr. B. H. Nunn:—

Nightingale	£1,444	0	0
Bossel & Botting	1,430	0	0
Hollands	1,380	0	0
Burton	1,335	0	0
Barnes	1,330	0	0
Chappell	1,309	0	0
Cheesman & Co.	1,260	0	0
Nash & Co.	1,259	0	0
Lockyer	1,250	0	0
Hammond	1,176	0	0
Blackmore	1,129	0	0
Miles (accepted)	1,085	0	0

For workshops in Charterhouse-square, Hull. Mr. R. G. Smith, architect. Quantities not supplied:—

Marshall	£390	0	0
Clarkson	386	0	0
Fluster	383	0	0
Thompson & Son	376	0	0
Helas	368	0	0
Jackson	360	0	0
Barritt	352	0	0
Evington & Warrram	335	15	0
Hockney & Liggins	335	10	0
Barr Brothers	335	4	0
Reunard	335	0	0
Stanley	327	0	0
Robinson	325	18	0
Jackson	325	0	0
Steele & Darnley	316	0	0
Hutchinson & Son (accepted)	313	10	0

For sewers at Stockton-on-Tees:—

Prior	£749	0	0
Young	699	1	9
Spooner (accepted)	686	2	0
Adamson	683	0	0

For new stabling, coach-house, and other works at New Malden, for Mr. Charles Woodroffe:—

Pierpoint	£244	10	0
Summers	186	0	0
Jones	150	0	0
Adrick & Salmon (accepted)	146	10	0

For the erection of stores, Gun-street, Reading, for Messrs. Chancellor & Anderson. Messrs. W. & J. T. Brown, architects. Quantities supplied:—

Barnicoat	£800	0	0
Matthews	741	0	0
Sheppard	730	0	0
Wheeler Brothers (accepted)	695	0	0

For works at Messrs. Waterers & Sons, Chertsey. Mr. T. Wonnacott, architect:—

Tulley	£1,675	0	0
Adamson & Sons	1,392	0	0
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SIR,—In your last publication respecting the Aber gavenny Market contracts it is said "the former contractor having failed." I beg to state that is incorrect; but the architects and the commissioners have failed in their part of the contract, which caused the stoppage. The whole matter is now under legal investigation, and the particulars of which must shortly appear.

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VOL. XXVIII.—No. 1426.

Salisbury, Sarum, and Surroundings.

MONEY does not flow in very abundantly at present for the restoration of the Lady Chapel at Salisbury, as a memorial of the late bishop. The works, however, are being proceeded with gradually; the Purbeck columns, now all to pieces, are being mended and polished, some of them being taken down and half renewed, and the result will doubtless be to bring back to its original condition one of the most interesting and elegant portions of the cathedral. At present, the works here and in the choir,—where Wyatt's coarse, ugly canopies of the stalls are being removed, and will give place to something that is sure to be better,—Mr. Scott directing, have enforced the erection of a temporary screen at the east end of the nave, that necessarily destroys the interior effect. Salisbury Cathedral has always seemed to us an over-praised building. Talk of it in the same breath with Westminster, Lincoln, Ely, or Canterbury, we will not. It is particularly valuable, its history is so clearly handed down; we have before us an almost newspaperish account of the people who were gathered together by Bishop Poor, on a certain day in the year 1220, to lay corner-stones. We are aware that it was consecrated in 1258; that it cost 27,000*l.* in the money of the day, exclusive of the spire, which was built a hundred years later; and we even know that the first clerk of the works was Elias de Dereham; and that after so serving for twenty years, he was succeeded by one Robertus. The very fact that it was carried out continuously in one style, as its admirers boast, prevents it from competing in interest with a building that has the history of centuries written in its various parts. It is wanting in sculpture, wanting in mind-work; and even the west front, charming as it is in many respects, is full of what would be called faults in a modern front. It is very much a mere screen, to begin with,—a thing of itself, and not the actual outgrowth of the plan and section of the building; the quatrefoil string, so to term it, that runs along the front over the second tier of windows, is greatly too large and coarse for the other parts of the design, while the way in which the arcades are mangled in parts is inartistic and indefensible; nevertheless, it is, as we have said, very charming after all, and especially so the central compartment, with its beautiful triplet. Indeed, when we qualify our praise as we have done, it is only in opposition to those who claim too much. The picture presented by the cathedral to the visitor entering the Close (the closed place) at the north-east is one not easily equalled and not soon forgotten. The pyramidal outline of the group, springing from a well-kept, brilliant sward, the central spire reaching heavenward some 404 feet, is perfect; and, approaching closer, the effect produced by the outline of the two transepts, and the dignity of their elevation are very striking. The lofty north porch, too, is a very fine feature.

The oneness of the design is the more remarkable, remembering the extent of the building. An ancient local rhyme gives some idea of this extent when it says,—

> "As many days as in one year there be,
> So many windows in this church you see.
> As many marble pillars here appear
> As there are hours through the fleeting year.
> As many gates as moons one here does view,
> Strange tale to tell, yet not more strange than true."

On the other side of the cathedral the view would have been much improved if the chapter-house, when it was under repair, had received a high-pointed roof, such as, we find no reason to doubt, originally crowned it, or was intended.

This chapter-house, by the way, is a work of rare merit and interest. The voussoirs of the arch in the vestibule and the spandrels of the arcade below the windows in the chapter-house itself contain the most interesting series of Mediæval sculptures anywhere to be found. Those in the vestibule represent figures of the Virtues trampling on the Vices, and are full of life and spirit. The series in the chapter-house sets forth in its own way the history of man from the Creation to the delivery of the Law to Moses. When the chapter-house was restored, a few years ago, under the direction of Mr. Clutton (not Clutterbuck, as accidentally printed in Murray's "Handbook for Wiltshire"), these were also dealt with, and the whole, as well as the arcade and other parts, were discreetly polychromed by Mr. Hudson; a tile floor, stained glass, Purbeck shafts, and colour in the vaulting, making the whole consistent and cheering. It is matter for great regret that much of this colouring is already destroyed, and that much more of it is doomed. A fatality seems to attend all our efforts to re-introduce colour in decoration. It appears, that in order to get a good surface for painting on, coat upon coat of paint was given to the stonework of the arcade, and the result is that this is now separating in a body from the stone. It comes off in such a thickness that it is difficult, without careful examination, to avoid the belief that the painting has been executed on paper or canvas, and that this is now separating from the wall. This is a very serious and regrettable matter, and we earnestly urge the dean and chapter immediately to call together a committee of advice on the subject, who should seek resolutely for some means to arrest the evil.

There is monumental sculpture in the cathedral well worth study, as every one interested in such works knows; notably the effigy of William Longuespée, Earl of Salisbury, who had King Henry II. for father, and "fair Rosamond" (*Rosa Mundis*) for mother, and died in 1226, at his castle in Old Sarum, where the cathedral originally was. The effigy, of stone, is full of charming feeling; the basement on which it rests is of wood, and was richly painted, gilt, and silvered. Such vestiges of the decoration as remain should be most carefully preserved. The very respectable verger of the cathedral, when showing to us the monument, was running into the old story of the connexion between the name of the earl and the length of the sword by the side of the effigy, but, seeing that he was being looked at, wisely glided off into "at least it used to be said so, but—," and so on. We wonder if he still points out the miniature effigy on the north side of the nave as that of the "Boy Bishop." It is hard to give up an old tradition and something to talk about, but we go fully with Mr. Planché in repudiating this appropriation. The story is probably well remembered. The choristers were in the habit of annually electing a bishop who sustained the office with mock dignity for three weeks, and the tale told for many years and now of the miniature effigy is, that it represents one of these play-bishops, who in the thirteenth century died during his brief reign. The tale will not bear examination. Who would go to the expense of a monument for such a purpose? Moreover, miniature effigies, reasonably supposed to indicate that a portion only of the remains (the heart, for example) had been deposited near them, are not uncommon. It might as well be said that the miniature female effigy in the Abbey of Jard, near Melun, commemorated a little fourteenth-century Queen of the May, and that the well-known cross-legged statuette of a knight in the Church of Horsted Keynes, Sussex, represented a crusading Tom Thumb of the Mediæval times. It seems a pity that Mr. King, in his "Handbook of the Cathedrals" (1861), should have repeated the story of the effigy of the Boy Bishop, as if it were unquestioned.

Glancing at some of the modern memorials, it will be seen that the brass that was put up against the west wall of the north transept, in honour of John Britton,—active, energetic, useful John Britton, the historian of the cathedral,—a brass put up at the cost of certain members of the Institute of Architects, has, like most other modern brasses that we know of, a rusty, wretched appearance, and that the lettering is scarcely readable. It will be desirable in any future works of the kind to avoid "rubrication," which, in the course of a few years, usually presents a ridiculous aspect, the coloured letters either staring out all alone, in a ghastly sort of way (while the rest of the inscription is undecipherable), or disappearing altogether, when the remainder of the words has a disposition to allow itself to be read.

If we get out at the west door and look again at the front, we shall see how much work has been recently done there. Mackenzie's admirable drawing of this front in Britton's volume, a drawing so correct that a photograph does not shame it, shows that only eight statues remained in the niches; there are now probably eighty, the work of Mr. Redfern, and which have been put in within the last few years. Looked at from a distance, they arrange themselves in five lines, exclusive of the Saviour "in Majesty" filling a vesica in the point of the centre gable. The figures are made to illustrate the *Te Deum*, commencing, "To Thee all angels cry aloud;" "To Thee cherubin and seraphim continually do cry;" and so on. Accordingly, there is a tier of angels, a tier of Old Testament patriarchs and prophets, a tier of apostles, a tier of doctors, virgins, and martyrs; and a set of worthies eminent in the English church,—"The Holy Church throughout all the world doth acknowledge Thee." The authority for this arrangement in this special case must be small, nor do we know that the vesica originally contained a figure. Mackenzie's drawing, to which we have referred, shows it filled with a quatrefoil. However, the scheme serves perfectly well as a foundation for devising a series of statues to complete the front, and some of them are remarkably well executed. They can only be regarded as decorative sculpture, and are necessarily valueless from any other point of view; very unlike, for example, the statues in a similar position at Wells, which, while they remain untampered with, serve to show the state of art in this country at the date of their execution, and to illustrate costume and ornament. Let us express a hope that in carrying out the intention which has been expressed to fill the vacant places at Wells, and repair the existing statues, the latter will simply *be* repaired and maintained, and that the new figures will be carefully marked as such.

The central niche of the eleven at Salisbury over the central door contains a representation of St. Christopher, with the infant Christ upon his shoulder; so that if the ancient superstition still prevail, that,—

> "To him who St. Christopher's figure shall see,
> Nor weakness nor failure on that day shall be,"

the good people of Salisbury may easily make themselves happy by good assurance every morning of their lives. This west front, we may mention, is later in date than the rest of the body of the church, even if the ball-flower ornament on the pedestals of the statues nearest the ground were sculptured after the front was finished.

The early history of Salisbury and its cathedral cannot be fully grasped without walking out to Old Sarum; but what we have to say of this and of other surroundings,—such as Wilton, and Longford Castle, with their marvellous collections, and the Museum in the city,—must wait for another occasion. Meanwhile, however, let us add a dozen lines on a domestic matter, first enjoying a peep into the cloister-garth, where loving hands for some months past have daily decked with flowers the grave of the late Bishop, and a charming view in the close, made up of ancient houses, dainty gardens, and the old grey archway. On "blythe May-day" when we were there, apple-trees were ablaze with such exquisite blossom as we have not often seen.

The hall of John Halle, the woolstapler, a well-preserved piece of domestic architecture of the reign of Edward IV., and some other remnants of the old times, may yet be found in Salisbury. The long-standing hotel, the White Hart, with its big columns in front, is now the "White Hart, Limited,"—word of omen dire to knowing travellers seeking comfort; a word suggestive of rooms flaring with new paint and paper, without pictures on the walls, a china cup on the mantelpiece, or an old-fashioned chair in the corner to awaken an interest; of extravagant charges, and utter inattention on the part of the overlooker, no longer a "host" but a "manager." We know of more than one party visiting this very White Hart, Limited, each staying two or three days, having private sitting-rooms, hiring carriages, and otherwise spending money, who yet never saw the manager, male or female, during the whole time. In the comfortable old-fashioned hostel,—take, for example, the charming "Peacock," at Rowsley, or "The George," at Northampton, full of knick-knacks from top to bottom,—it is the custom of the landlord or landlady, as the case may be to bring in the first dish at dinner, and a good custom too; and it is pleasant to find in many parts of Germany and elsewhere, the landlady, when the bill has been paid, waiting to see her guests depart, and handing a *bouquet* to Madame, with hopes for a kind word in her favour to friends coming that way. The "managers" in England for hotel companies, "limited," are either too great people or too entirely stupid to adopt any such course of proceeding. If hotel companies wish for satisfactory dividends, they must set to work to educate a race of good managers, and lower their prices, so that the advantages and pleasures of travelling in England may be extended to larger numbers than can now venture upon the attempt to obtain them.

HOMERIC ARCHITECTURE: THE PALACE OF ULYSSES.

THERE is something more than mere archæological interest in an endeavour to recover some details of the palace of Ulysses,—of its plan especially, from the scattered notices in the Odyssey;—of the palace that is, as conceived by the poet, and manifestly taken for granted by him as a model familiar to his original auditory. A lively realisation of localities and distributions of space is certainly not so necessary for the enjoyment of this poem as of the "Divina Commedia;" and, as the Greek poet doubtless referred to a scheme of well-known arrangements, there is no reason to credit him here with even a portion of that marvellous faculty of inventive construction that often disposes us to exclaim—whether descending from circle to circle, or ascending from sphere to sphere—"How great an architect was in Dante lost."*

Still, the great crisis of the poem, at the contest with the suitors, in the 21st and 22nd books, involves so much going in and coming out of, and moving about the palace, that we may do injustice to the simple consistency of the poet, unless we can place ourselves at that point of view of the field of action that he might fairly expect those who should be interested in his story to occupy.

We proceed at once to the scene where the notices that we are chiefly interested in, and the occasions of their interest, lie most closely together. We shall take the liberty for other than mere typographical considerations, to substitute italic equivalents for letters from the Greek fount, unless when moved to an exception.

It is in the seventeenth book that Ulysses—disguised, indeed metamorphosed into the semblance of a beggar—comes in sight of his home after an absence of twenty years. He is as yet unrevealed even to the loyal servant Eumæus, who by command of Telemachus, at present sole possessor of the secret, is conducting him; confident as the much-enduring man may be in his self-control—he has just endured to be spurned vilely by one of his own slaves without retaliation, without a word,—he greets the place in terms calculated to explain away any slightest sign that might escape him of recognising what he was professing to see for the first time. He breaks out in admiration: the structures (*dōmata*) are too beautiful not to be those of Ulysses,—easily would they be identified though amidst many others. Their extensiveness is also indicated (v. 266), one set follows on in connected order with another; the court (*aulè*) is finished off with wall and coping-stones, which, with the double or folding doors make a thoroughly effective enclosure. We have thus the general image of a palace that reminds us—though apart from the town—of the principle of the vast pile of the Strozzi in the midst of faction-worried Florence, or of an English castellated mansion in Mediæval times. Offices and homestead are comprised within a solid external wall, and a main entrance is well closed by a door of corresponding stoutness. It is here at the approach to the portals (xvii., 297) admitting to the enclosure of the *aulè*, that the affecting incident occurs of the dog Argus recognising his master with expressive ears and wagging tail, but—too old and weak even to crawl towards him—dying as he greets him again,—again, after the twentieth year. Incidentally this leads to the mention that here, full in front of the entrance—but we are by no means bound to suppose close to it—was the heap of manure from mules and oxen accumulating till it should be carried away by the servants and spread over the vast *temenos*, or domain of Ulysses. So kingship is presented to us in Ithaka as a mode of life as mixed up with the primitive and prædial, as the authority of any chairman of quarter sessions that ever was interested in the question, "how a score of ewes at Stamford fair?"

The situation of the palace, we may note, is away, but not very remote, from the town, whither the suitors habitually repair to the agora, and every night to sleep; and it is within view of the sea; for when the suitors have sallied forth from the "megaron out beyond the great wall of the aule in front of the portals," and are debating how to notify to their comrades at sea the return to Ithaka of the waylaid Telemachus, one of them turning his head bursts into laughter as he sees their vessel just entering the port bootless from the murderous expedition (xvi., 343).

In the first book we have another description of an arrival at the palace,—Minerva, no less, in disguise, personating a Taphian prince, appears at the *prothyra* (here in the plural), the vestibule or, at least, space before the doors, of Ulysses, standing on the threshold of the aule (*oudos auleios*, i., 105). Here she finds the suitors in "front of the portals"—the same phrase that is used for the position of Argus—amusing themselves at draughts or dice (*pessoi*); they sit on the hides of oxen slaughtered for their revels. Telemachus, who is seated among them brooding over his discontent, sees the stranger at the doors, makes direct (v. 119, ἰθὺς προθύροιο) for the *prothyron* (singular), to welcome him, conducts him to within the lofty *domos*, sets his spear against a tall column in the well-smoothed *dourodoke*—"spear-holder" (original suggestion, it has been thought, of the flute),—and prepares a hospitable welcome.

While the suitors amuse themselves, the servants are preparing within for the feast, mixing the wine, sponging and placing the tables, and cutting up meat. As Telemachus leaves the suitors to proceed to the prothyron, they are not to be conceived as lying about within an actual vestibule outside the door of *aule*, but merely in the general space in front of it; so, on the later occasion, they are exercising themselves with the discus and throwing the spear on a *tukton dapedon*, a made or levelled plot, πάροιθεν, in front of, the *megaron* of Ulysses; and thence, called by the herald Medon, they proceed into the *domos* or the *domata* (xvii., 175—178) to the feast.

Megaron, it is clear, is used here, as we shall find it occasionally hereafter, in a general sense, like *domata* and *domoi* frequently, and the scene was thus exterior to the *aule*; indeed in front of it, like that of the dice-playing, "before the doors."

Eumæus, leaving the supposed beggar to follow, enters the building, the *domoi*, and proceeds direct to the *megaron*, ἴθὺς μεγάροιο (xvii., 325) to the feasting suitors. Ulysses speedily follows, and seats himself on the ashen threshold, "the *melinos oudos*, within the doors, and leaning against the door-post of cypress-wood that the joiner on a time had skilfully smoothed and set up vertically by the *stathme*," or rule. Here he is seen by Telemachus within, who sends him food, and from hence, at his suggestion, he rises to beg of the suitors in order.

The wooden—*melinos*—threshold and highly wrought doorway indicate a doorway to a chamber, not to an open court,—to the *megaron* proper, or, as the derivation implies, great chamber, the dining-hall of the men. Thus the *aule* is first entered from its *prothyron* over the *auleios oudos*, and from the *aule* by the *melinos oudos*, the *megaron*, or dining-hall.

But it is while Ulysses is seated here that the vile mendicant Irus arrives to abuse and challenge him,—miserable and aged as he seems; and his first greeting is, "Be off from the prothyron," the vestibule we have to assume pertaining to the megaron, and comprising its threshold. An altercation quickly arises before the lofty doorway, thus rather without than on the inner side (προπάροιθε, xviii., 32) upon the "smoothed threshold." The suitors all rise up and crowd about to foment the fray, encourage the seemingly unwilling Ulysses, and drag the really reluctant Irus (ἐς μέσσον, v. 83) into the midst, but to which side of the threshold does not at present appear. Ulysses, fearful of being recognised or suspected, determines only to injure his adversary moderately, not kill him outright. Anticipating the pugilistic canons of Jackson, he contemns a blow on the right shoulder in order to plant one,—decisive,—on the neck of Irus below the ear, breaking his jaw, and felling him helpless to the ground. The suitors are charmed, as were charmed English peers and princes of a generation now fast dropping away; but Ulysses, taking him by the heel, dragged him "out through the *prothyron* till he came to the *aule* and the doors (*thyrai*) of the *aithousa*" (xviii., 101), of which presently; there he set him up leaning against the *erkion* of the *aule* (the external wall of the *aule*), and left him, giving him a stick to keep off dogs and swine, and a moral lesson in humility and modesty to ponder over.

He himself resumes his wallet and his place at the threshold, and the suitors (v. 110) "came in," laughing heartily and applauding his victory.

It would seem to be clear from the description of its sequel that the battle took place "in the midst" of the dining-hall, or *megaron*, in the space left vacant by the seats and small tables that are always described as in rows on either side (vii., 95), and that it was out through the doors of this that Ulysses dragged Irus by the heels, and through its *prothyron* into the *aule*, and thence again through the outer door, the external gate. Both the *aule* and the *megaron* have, as we have seen, each a portal; that of the *aule* admitting into the building from without; that of the *megaron* intermediate between it and the *aule*; and each portal has its own *prothyron* or vestibule.

It is said, however, that the suitors come in (ἔισω) after witnessing the fight, which seems to imply, inconsistently, that it took place in the *aule*, unless we suppose either that the ring was formed in the prothyron of the megaron, or that they followed Ulysses as he dragged out the groaning and defeated bully.

After the phrase, "till he came to the *aule* and the portals of the *aithousa*," we are bound to identify the portals of the *aule* with those of the *aithousa* as admitting to it. But what, then, is the *aithousa*, and was it within or without the *aule*? On these points we may gather collateral illustration from the descriptions in the poem of other palaces. The presumable derivation of the name implies brightness, warmth, as from direct admission of the solar rays.

* A report has reached London that a German *savant* engaged in exploring the plain of Troy, while making some excavations near the village of Cyplax, came suddenly on the ruins of a cyclopean wall, about 8 ft. thick. The works were actively pushed on, and, from what has already been brought to light, the writer is convinced that he has at last discovered the remains of the famous palace of Priam. Indeed, he asserts that the part of the ruins already uncovered exactly tallies with the description of the place given by Homer in the "Iliad."

In the palace of Menelaus (iv., 302) proper and, indeed, luxurious beds are made up for Telemachus and his companion in the *prodomos* of the *domos*, under the *aithousa*, which here, and constantly, has the epithet ἰριδόντος, or sounding; and, again, their bedsteads and beds were set in a corresponding place in the house of Nestor (iii., 399). This was for bachelors. Nestor himself, as Menelaus likewise, retires to his conjugal chamber,—the *muchos* of the lofty *domos*—a retired apartment in an upper story.

Ulysses also—a beggar truly—but hospitably favoured by Penelope (xx., 1) sleeps in the *prodomos*, though with no bedstead. Fleeces are laid upon a bull's hide, and he is supplied with coverlets which in the morning he takes into the *megaron*, carrying the hide, δύραζε, without. In the palace of Alcinous he has like dignified accommodation as his sons (vii., 345).

The *aithousa* is thus a member of the *prodomos* at Pylos and Sparta, as of the *aule* at Ithaka; its occupants are always spoken of as in the *prodomos*, but *under*, not *in*, the *aithousa*. The prodomos, therefore, had its *aithousa*, as well as the aule,—or rather we have to infer that the *aithousa* extended round the aule, but on the side of the *domos* a *megaron* received a certain development as its *prothyron*, and by closer connexion with the house and its offices became distinguished collectively as the Prodomus. Here there is no unbecoming accommodation to be found for a sleeping-place, while at the remoter side, near the main gates, goats and cattle brought up to supply a festival, are fastened up. It is under the *aithousa* that Philœtius finds the piece of ship-timber with which he blockades from within "the portals of the well-fenced aule" when the time is coming on for the onslaught on the suitors.

The epithet "sounding" or "resonant," is manifestly applicable enough to a long roofed corridor or lean-to open at one side.

As regards the *prothyron* of the *aule*, no proof so far appears—let us rather say, no presumption—that it was covered like an advanced portico. The following notices settle some points, but leave this still open:—Telemachus and Pisistratus draw up their horses at the palace of Lacedæmon as Nausicaa her mule-car at her father's, in the *prothyra* of the *domoi* (iv., 20; vii., 4). But when Telemachus takes leave of Menelaus, the horses are put to, and they drive forth of the *prothyron* and the sounding *aithousa* (xv., 191). The great door of the *aule* was thus wide and spacious enough to admit horses and chariot, which agrees with the massive timber that Philœtius employed to block them. We may now also infer that the stables were within these, where the servants on their arrival (iv., 39) had put up, and fed the horses, and propped the chariot against the bright walls *enopia sigaoenta*. Hence, also, is explained how the dung-heap of Ulysses came to be placed so naturally, however unhandsomely, near the entrance of the *aule*. The goats and steer brought for the suitors' feast are fastened in the *aithousa* (xx., 178—189). The swine are left to feed about the ερκεα (xx., 164). Thus we are brought to the distribution described in the Greek house of Vitruvius, where the main entrance admits horses as well as foot passengers, and the stables are arranged on either side of it, and thus close to the road and as remote as may be from the inhabited rooms.

The aule, it is now clear, must have had considerable extent, and is not to be confined to the limits of a mere apartment; it was answerable to the bailey of a Mediæval castle, surrounded by a wall, well-built, lofty, and with strong coping. It had one main and strong door,—the space in front of it, whether covered or not, most probably, I think, including a covered portico, is the *prothyron*,—the door has double leaves, and within are stable and stall for mules, horses were unsuitable for Ithaka, and oxen; for the latter possibly only, as they were brought up for slaughter at sacrifice and festivity.

On the return of Telemachus from his excursion, his first care is to reassure his mother; on reaching home, he placed his spear against a tall column, and went in (ἔισω="ben") himself and stepped over the stone threshold (*laïnos oudos*), and here Penelope meets him issuing from her *thalamos*,—which, for anything that appears, is on the ground floor, the rather as on quitting her he goes "through out from the *megaron*" (xvii., 61).

This stone *oudos*, or threshold, is mentioned again (xxiii., 88) when Penelope descends from her upper chamber, and "entered passing over it" to where Ulysses is seated by a tall column in the full blaze of a fire that has been lighted to purify the megaron. This, therefore, is the threshold of the door that separates the more public from the private, the *andronitis* from the *gunaiconitis*—the domestic and women's division of the palace. Penelope descends by stairs from an upper chamber (i., 330) to expostulate with Phemius for the painful subject of his Trojan song, and thrice with the suitors, and presents herself before the megaron each time "standing by the *stathmos*—'door-post' probably—of the firmly wrought *tegos*," or roofed structure (xvi., 413. Cf. v. 449), and again in almost similar terms (xviii., 206, and also xxi., 64). It must be on the inner side of this doorway that she sits "by the stathmos of the megaron" (xvii., 96), probably the same as that of the τέγος, reclining and whirling the spindle while Telemachus and his guest take refreshment before her, after issuing from the bath provided under the customary tending of the female servants.

It is in this position that the maiden Nausicaa stands to interchange those last words with Ulysses that have touched the tenderest and strongest hearts for thousands of years (viii., 458).

The room which is thus entered from the megaron, is perhaps rather of the nature of a corridor, having the spaciousness of a hall, like the *tablinum* of a Pompeian house; we have seen that one *thalamus*, at least, opens into it. It seems to pertain to the division of the general structure, or assemblage of structures, that is sometimes specially designated δῶμα or τέγος.

In the 19th book we have an example of how the same word is used, in both a collective and distinctive sense, within a few lines. Ulysses, after all have retired, remains alone in the megaron. Hither comes Penelope from her thalamus to inquire his news of her husband; and the female servants, who had previously been locked out from the megaron by Eurycleia (xix., 15—30), came out *from the megaron* (xix., 51—60), and proceed to clear away the remains of the feast,—the tables and cups of the retired suitors,—literally, therefore, they come out from the megaron into the megaron; the same observation applies to their entrance (xxii., 497); so in the touching remonstrance of Ulysses with Amphinomus *melathron*, elsewhere, Ulysses with Amphinomus *melathron*, elsewhere, particularly the blackened roof-tree,—is used as general term for the palace,—and to move across the megaron, or dining-hall—the "great chamber" of Master Slender, is to proceed διὰ δῶμα (xviii., 150—153). Penelope, again, speaks of her flock of geese feeding from troughs κατὰ οἶκον and εν μεγάροις (xix., 535).

The conclusion hereafter.

PICKINGS AT THE ROYAL ACADEMY.

THE 1,229 pictures and other works of art exhibited this year in the galleries of the Royal Academy have been talked about at such length in so many places that, in view too of more than ordinary pressure on our columns, we were disposed to confine ourselves to a review of the architectural drawings. We cannot, however, bring ourselves quite to this; but shall, nevertheless, restrict our observations to comparatively few works.

The general opinion entertained that the Exhibition of 1870 is not quite up to the mark of some of its predecessors is probably chiefly due to the absence of those special stars or universally-admired favourites which, on some former occasions, have taken the public by storm. Of the highest grade of merit illustrated (and that we regard by no means as a contemptible one), there probably will be found a larger number of works than usual; and the absence of very bad pictures, though by no means total, is tolerably satisfactory.

The veteran Landseer, who last year did not increase, even if he could be thought to maintain, his high reputation in his own branch of art, comes to the front with two very remarkable pictures. There is the more cause for congratulation that this should be the case, since Sir Edwin has permitted himself to send for display a picture noticeable for its size, and eminently deserving attention for its subjects, but, in other respects, fit only to be passed by in solemn silence. How this great artist, unless fettered by "command," could have completed and sent for exhibition such a work we can explain to ourselves only by the same merciful disposition of Providence which seems to protect puny, sickly, and deformed children by an especial share of their parents' love.

Sir Edwin's "Voltigeur, Winner of the Derby and St. Leger, 1850," catches the eye before the visitor enters the first gallery. Devoid of the slightest trace or attempt to make a picture, it looks, from that spot as well as on a nearer approach, a live horse, and a very noble one; its blood showing in the delicate nostril, its points fully defined, and its lustrous skin, not too recently curricombed, gleaming with apparent swell and rotundity of muscle. Two wonderful cats mutely call on the spectators to share their own evident admiration of the grander quadruped. The background of stall and litter is slightly, but not too slightly, painted in; and we see what a race-horse not only should be, but actually was in 1850. The second of these portraits of our four-footed cousins has a bad title, which may be taken, we feel sure not correctly, as a skit on a very noble and self-denying profession. It is called, (265) "Doctor's Visit to Poor Relations at the Zoological Gardens." We would take it that the hour of the visit is alone intimated; and that the supremely unconscious black monkey, who sits perched upon a rail behind the larger green ape tending her sick offspring, is not intended for a medical visitor intent only on his fee. The black ingrate holds a large fruit in his hind hands, without prejudice to their function of maintaining him on his perch, at the same time that he is eagerly emptying a similar luscious morsel, which he holds in his anterior graspers. Naturalists find a dozen errors in the picture, but the sick look of the baby monkey and the anxiety of the parent are life itself.

The question has been raised as to the true secret of the wonderful manner in which the animals of Landseer lay hold on the mind. It is not by truth to nature alone. It has been suggested that the painter represents human passion under the guise of animal nature. This, however, is caricature, and not one of the six animals we have mentioned approaches a caricature. We hold that the kernel of the matter lies deeper. There is, to a certain extent, an actual community of passional, and almost of intellectual, nature between man and many of the vertebrated animals, more especially with beasts and birds. The common emotions of parental instinct, greediness, fawning admiration, quiet enjoyment, as illustrated in the paintings before us; the agony of flight or the ardour of the chase; the fierce resolve that turns to bay; the sense of duty, evinced in the performance of the functions of a sentinel; to refer to some others of the best known of Sir Edward's pictures:—all these are sentiments natural to, and powerful in, both man and beast. The painter who seizes these sentiments in the moment of their most vivid entirety, clothes them in well and truthfully rendered animal form, and thus brings "our poor relations" before us, as part of that great family of which we hold the primacy, gives a more deep and truthful lesson than he may himself altogether apprehend; or, if so, he apprehends it, as we admire it, by instinct and not by argument.

It seems somewhat unchivalrous to name such a portrait as that of the Marchioness of Huntley after the animal life of Landseer; although the public curiosity has probably followed this order in seeking gratification. The large price of two thousand guineas, which is known to have been paid for this portrait, hardly affords so good a reason for giving it minute attention as may be found in the beauty of the subject, and in the brilliant skill of the painter. But the truth is to be held to above all things, and the truth we take to be, that Mr. Millais has scarcely consulted his own great reputation, of which we all feel justly proud, by the style in which he has turned out of hand this, as well as some others, of his later works. From a certain standpoint the effect is magical. But something more is needed in a picture that is to live. The lady is represented as standing in a conservatory, with a basket of flowers on her left arm, and her garden scissors hanging from her right hand. Attitude and expression are noble and dignified; the features are beautiful; and the close bands of dark hair set off a thoroughbred head. In play and sparkle of colour, lighted up by the contents of the basket, and relieved by the ground and background greenery, there is nothing left to be desired. But the tropical plants behind the noble lady are indistinct almost to smudginess. The trees woven in a fairy bower, if viewed from a distance, display splotches of white paint, which seem as if laid

on with a trowel, when looked at closely. It is to be feared that a picture turned out of hand with this roughness will not be durable.

We write with an unaffected regard for the fame of an artist as to whom we think that England can no more afford that he should waste his time in fanciful experiment, than it could in the regrettable case of Sir Joshua Reynolds. We see, in the satin bows of Lady Huntley, in the ribbed trowsers and felted coat of Mr. John Kelk, a result of a visit to M. Doré's gallery. But it is the handling of his Francesca, not that of his Alsace Knitters, by which M. Doré will wish to be remembered; and a similar opinion will, we have no doubt, hereafter be that of Mr. Millais.

Of the other pictures by this artist, that of the boyhood of Raleigh is, perhaps, the finest. There is more careful painting on this canvas than on those we have cited. On the other hand, there is a luxuriant wealth of colouring that almost fatigues the eye. The blue of the sea, the green of the lad's dress and hat, the Brazilian shimmer of the heap of pebbles, the fiery glow of the rusty anchor, the strong but not inappropriate colouring of the tattooed vagabond who is feeding and intoxicating the lad with tales of travel until his soul seems ready to leap from the blue depth of his eye,—are all evidences of a wonderful mastery over colour. The attitude of the boy is admirable. This is a picture which, somewhat toned down by age, the painter may be proud to leave behind him.

Another charming work by Millais is "A Flood" (No. 91). A wooden cradle, containing an unconscious infant, is floating, or, perhaps, stranded, on a muddy lake, caused by a sudden overflow of the fens. On a tree, dripping with brilliant rain-drops, and with its branches encrusted with such emerald and ruby lichens as grow not in any but fairy fens, sits a wet chaffinch. In the danger of the hour, the child's fellow traveller, a miserable, drenched kitten, mews forth her alarm, unattracted by the vicinity of the bird. The parents are putting off in a boat in the dim, Dutch distance. The patchwork coverlet, and the floating jug of yellow ware, give a homelike truth to the scene.

But the work of Mr. Millais which, in the present Exhibition, has most interest to those who look to the future of art in this country, is No. 202, "The Knight Errant." A beautiful woman, entirely undraped, is bound to a beech standing in the centre of the picture. A knight, clad in full plate armour of the sixteenth century, is cutting the rope that binds her. The corpse of one of the ruffians, whose handiwork he is undoing, is visible in a dell hard by; and the distant figures of two other brigands are defined in hasty flight against the horizon. The tree is a miracle of forestry. The face and attitude of the knight are tender and gentle; the colouring of the picture is worthy of the pencil of Mr. Millais. But how about the main motive,—the captive? The reply to this question is a matter of no ordinary importance, and yet we will not here pursue it.

The name of J. L. Gérôme appears with the initials denoting an honorary foreign associate, and pictures from this artist are on the walls of the Academy. No. 18, "The Death of Marshal Ney," is a powerful, gloomy sketch. The form of the "bravest of the brave" lies extended on the ground. The firing party is hurriedly retreating, as if ashamed of their work; an officer glancing over his shoulder as he follows his men. Two or three fresh marks on the plaster of the wall, above the fallen man, tell a sorry tale in a fearful language. The great dome of the Invalides soaring through the mist beyond seems to speak of the murder of the soldier, when the errors of the man clearly have been forgotten. A still further demand on the capacity for awe and romantic sympathy is made by (985), "Jerusalem." Yet this well-known picture so outrageously defies not only realistic truth, but the harmony of historic incident, that it will not bear the slightest criticism in this respect. A long, picturesque group of Roman troops, preceded by white-robed Jews, is winding along a road leading from the Olivet hills, east of Jerusalem, towards the Holy City. The double gate towards which their course tends is, apparently, meant for St. Stephen's Gate. But the wall is about as much like that of Chester as that of Jerusalem. The locality seems to have been rudely sketched from a drawing, by Count de Vogüé, of the present state of the city, neglecting the great changes effected by the siege under Titus, as well as by subsequent events. The mighty wall of the Haram has dwindled to a mere parapet. The deep cleft of the Kedron valley is nowhere. On the area filled by the courts and cloisters of the Temple, and by the fortifications of Antonia, grow trees, like those in a modern cemetery. Ridiculous little bits of building, miniatures of the mosques El Sakrah and El Aksah do duty for the gorgeous temple of Herod. Nor is the want of truth topographical alone. The group following the soldiers, from the ladder and other insignia which they bear, as well as from the mysterious darkness spreading over the scene, appear to be intended as proceeding to the Crucifixion. They could no more have approached Jerusalem from the east for such a purpose than a review in Hyde Park could have conducted Lady Jane Grey to the Tower. The gloomy, drifting veil, towards which two of the groups are, very theatrically pointing, seems intended to indicate the supernatural darkness of the hour. The idea suggested that the effect produced is of volcanic origin, is one which is not unfamiliar to those who are accustomed to these awe-striking phenomena. But the moon, which was at the full at the Passover, is represented as a crescent! Nor is the actual progress of the profound darkness in which stormy volcanic ashes veil a landscape such as is here represented. It advances like a wall of night. Before it, all laughs in sunshine; behind, or beneath it, all is obliterated from the view. It is like throwing a mask of ink over a landscape.

Alma Tadema contributes three of his Roman interiors, gleaming with marble and paved with mosaic. The faces, although for the most part Roman in their outlines, wear a look of sadness. These graphic restorations of the buried life of the Campanian cities might almost serve as illustrations of the occupations of the Elysian fields.

Of Mr. Calderon's four pictures, one is a very charming one, "The Orphans" (143). A girl, dressed in mourning, playing a harp, as a wandering minstrel, in the snow; her little brother, the sorrow of their mourning heightened by the incongruity of his stained red stockings, looking on with eyes that must be seen, not described. We do not envy the man who can look at this touching picture without feeling a tightening in the chest, or a mist coming over his eyes.

Mr. E. M. Ward, R.A., has produced a picture that will live, in (203) "Judge Jeffreys and Richard Baxter." It is full of striking contrasts, all blended and bound together by the story. The vulgar, insolent judge thundering from the bench—the dignified, sorrow-stricken form of the defendant,—the manly, indignant self-control with which his supporter regards the unjust judge,—the courtier pointing jestingly to the scurrilous song,—the old dame, in a Welsh hat, expecting to see some sign from Heaven to rebuke the harsh impiety of Jeffreys,—the patched lady of fashion moved almost to tears,—these are only some of the many telling points of this admirable picture. No. 363, by the same, "The Daughter of a King," is well known, from an excellent engraving.

Mrs. E. M. Ward's "First Interview of the Divorced Empress Josephine with the King of Rome" (No. 916), is characteristic and suggestive in expression, full and rich in colour, and careful and level in finish. It is no small praise to say that it seems to us the best picture our accomplished countrywoman has yet painted.

There is something very charming in Mr. G. O. Leslie's "Fortunes" (104), a group of pretty girls watching the course of the roses which they throw into a little mill-stream at their feet, to indicate, by their prosperous or adverse voyage, the course of their own true loves. The picture would have gained by additional height, as the park scenery stretching behind gives a background of unbroken green, to the exclusion of the sky. No. 216, "Carry," by the same artist, a flower herself, contemplating other flowers, is also very pleasing.

The water in No. 45,—"Clare Island; the wind going down with the sun," by J. Brett,—seems actually to swell and heave on the canvas. A scene on the west coast of Ireland, No. 126,—"Contiguous to a melancholy Ocean,"—is another fine sea-piece by the same artist.

"Michael Angelo," in No. 134, by H. O'Neil, does not grasp his chisel like a sculptor, least of all like the most fiery of sculptors. He is working too tenderly, and in his own shadow. The subject is well chosen.

One of the most pleasing pictures in the exhibition is (157) "Sir Roger de Coverley and the Perverse Widow," by W. P. Frith. The artist has admirably expressed the selfish, unimpressionable character of the coquettish widow, under all her beauty and rare attraction. Poor Sir Roger! who could resist that adjustment of the tucker? The confidante is just malicious enough; one can see how her mischief would burst into flame when the knight was gone. His manly beauty is of a noble type—the perfectly-arranged dress, the honest, earnest, manly love that beams from his figure as well as from his face. The soft Persian tints of the screen and the carpet unite with those of the dresses in a well-adjusted harmony. It is a charming picture. Not less so, in design and execution, is No. 267, "The Pulse, the Husband, Paris." No. 364, "Mrs. Rousby as Princess Elizabeth in 'Twixt Axe and Crown,'" is, *not* Princess Elizabeth, but Mrs. Rousby. It is none the less charming for that defect.

"Louis XIII. and Louis Quatorze" (No. 161), is a subject which we suggested to Mr. Calderon for a theme some three years ago. It is admirably rendered by Mr. Elmore. The contrast between the pallor of the dying king, the fresh health of the infant dauphin, whose likeness is most truthfully preserved, and the anxious, boding, look of the lady who has him in charge, is very fine. "An Arab Toilet" (No. 986), by the same, is bright with Oriental life and colour.

Mr. Cook has some fine landscapes, clear and distinct as those of Canaletti, with more depth and power than is often evinced by the Venetian painter. (87) "Venice," a moonlight view; (189) "A Calm Day on the Scheldt;" (266) "A Topo, or Lagune Fishing-boat, Venice," heavy with the repose of Italian noon; (365) "Landing Fish—Coast of Holland," with its characteristic Dutch boat, and leathery sails, are all pictures full of the beauty of nature.

We cannot pass 409, "St. Francis preaches to the Birds," by H. S. Marks. The saint has a more respectable and attentive audience than always falls to the lot of his followers now-a-days. All birds most rare and bizarre in beak, and plume, and ruff, and whisker, are there. The hungry pelican crouches on the ground; the kingfisher pursues its prey unheeding the words of peace. The preacher is a little like Dean Stanley. The birds are much more lifelike than the stuffed remains that stiffen under secular coats of dust in the British Museum.

Mr. Faed's little Irish boy slipping out of his garments "when the day is done" (192), is very true to nature. The "Highland Mother" (968), though rather rough, is effective.

We must not omit to notice the life, and movement, and full, stirring, incident of the last production of Maclise, (197) "The Earls of Desmond and Ormond." The fiery gesture with which the prisoner throws up his arms is reflected, as it were, by the arch of the rainbow. It is thus that a hope, which is not altogether of the earth, earthy, attends on the indomitable struggles of genius and perseverance, in days of menace and of evil.

MINTON'S CHINA WORKS.

FOREMOST among the industrial "lions" connected with the ceramic art, stand the china works of Messrs. Minton, at Stoke-upon-Trent, some account of which will doubtless interest many readers of the *Builder*. The works were established in the year 1789, by the late Thomas Minton, a native of Shrewsbury. Mr. Minton was a practical engraver, and clever at his art. He commenced at a time very favourable for progress. The labours of Wedgwood, which had attracted so much attention to English pottery, had paved the way for success, and called for an increased production. An import trade had in fact been converted into an export one. English pottery then commanded a high range of prices, and it may be interesting to remark that the old "willow" pattern was first introduced at these works (copied from an old Chinese plate, the production of Ching Chang Foo), and was then sold at 5s. 6d. per dozen plates, whereas the present price averages about 2s. The productions of this house were for a number of years principally confined to useful articles; and being of a good durable material, without much reference to artistic decoration, soon commanded a good position in the home market. Mr. Minton's career was highly successful throughout, and he died in 1836, leaving a handsome competence. He was succeeded by his second son, Herbert, who obtained, as is well known, great eminence as a potter. He was possessed of a fine cultivated taste, with indomitable energy to carry out his views of im-

proving the art. He invoked the aid of the best talent at his command, both English and foreign; and the specimens in almost every variety of style shown at the Exhibition of 1851 may be referred to as proofs of his success. On that occasion, the first specimens of Minton's majolica ware, now so celebrated, were exhibited; as was also for the first time a combination of Parian statuary with decorated porcelain for dessert services. The service of this class was purchased by her Majesty as a present to the Emperor of Austria. Mr. H. Minton was commissioned by her Majesty to make the presentation; but, as great coolness had arisen between the two courts on account of a speech made by Lord Palmerston, some delay and difficulty occurred in obtaining an audience; but it was at length satisfactorily accomplished; the present was graciously received; and cordial relations were soon afterwards resumed. Mr. Minton was throughout his career as much distinguished by his philanthropy and liberal support of every benevolent object as he was for his skill and eminence as a potter. It may be mentioned that amongst his many other good works he built and endowed the beautiful church at Hartshill at his sole cost. After a brief retirement from the active pursuits of his calling he died at Torquay, in 1858. It should have been mentioned that to Mr. Minton the public are indebted for the revival of the art of making encaustic pavements, now in such general demand for churches and other public as well as private buildings. It will illustrate the character of the man if we state that for many years he pursued this branch of business at a very considerable annual loss; and when on one occasion he was urged by his partner to give it up, his characteristic reply was, "Say no more, now: I will make encaustic tiles if they cost me a guinea each." Mr. Minton took an active part in preparing for the Paris Exhibition of 1855, and had repeated interviews with the Emperor, who presented him with the Grand Cross of the Legion of Honour.

Mr. Minton was succeeded by his nephew, Mr. Colin Minton Campbell (High Sheriff of Staffordshire last year) and Mr. Michael Daintry Hollins; and these gentlemen worthily emulated the conduct of their deceased relative by doing all in their power to continue the fame that had been achieved, until they dissolved partnership in 1868. The encaustic tile department devolved upon Mr. Hollins, and all the other branches of manufacture are carried on as usual by Mr. Campbell, in conjunction with his cousin, Mr. J. W. L. Herbert Minton, so that the old name is not likely to become extinct.

The manufactures of the firm embrace nearly every article of the potter's art; so much so, that any one embarking in the retail trade might, from these works alone, completely furnish his shop, from the richest and most costly ornament, to the requisites for kitchen use. The cost expended in modelling these varied manufactures, has been enormous, as any one would readily imagine who paid a visit to their show-rooms, which contain only their own productions. The annual value of the ware produced has averaged of late years about 105,000*l*.

The number of hands employed, is between 1,600 and 1,700, and amongst them there are upwards of 600 females, a fact of especial interest to the Society for Promoting the Employment of Females; but the products of the industry of this large number will make but an indifferent show at the forthcoming "Workmen's International Exhibition." The females are variously employed. The greater number are employed in enamelling; that is, in colouring patterns that are printed in outlines. Others are engaged with the printer transferring the prints to the ware; some attending the throwers and turners; and many engaged in the warehouses. There is only one lady painter in the establishment, and she boldly challenges competition with the sterner sex. The art-director of the establishment is Mr. Leon Amoux. There are two clever German painters; all the rest are English, some of them superior artists, and who derived much advantage from their course of study at the School of Art, conducted at the building erected as a memorial of the late Herbert Minton, in this town.

The firm gained the council medal at the Exhibition of 1851, and the *médaille d'honneur* at the Paris Exhibition, 1855.

"A Place Open to Merit."—Several correspondents inquire for further particulars. We must refer them to the Office of Works.

SIR JAMES Y. SIMPSON, BART.

SIR,—From his endeavours to aid in the improvement of the construction of hospitals, and the proposal to place a monument of him in Westminster Abbey, a separate memorial note of Sir James Simpson may, perhaps, be allowed to appear in the *Builder*.

In reference to his attack on hospital crowding, Dr. Millington, who was a pupil of his, says,—

"One matter, from its vast and increasing importance, must not be passed over. The humane mind of Simpson had been directed for years before his death to a subject which is only just now receiving the attention it ought long ago to have done. He had long been shocked at the result of amputations in large hospitals; and after ten years' investigation he began an attack on hospital crowding, and the direful evils which result from it. His vigorous mind was to the very last occupied with what has taken the name of 'Hospitalism;' and the results of his labours have yet to come; and will, in the opinion of the writer, be productive of incalculable good; though the subject has not yet been investigated so thoroughly that the exact cause or causes of the mortality after amputations performed in large hospitals can be said to have been thoroughly ascertained."

Dr. Millington states, that Dr. Stanley, the Dean of Westminster, had readily consented to the burial of Simpson's body in the abbey; but by that time preparations had been made for a public funeral at Edinburgh; and seventeen hundred persons followed his remains to the grave.

In the numerous accounts of Sir James's doings which have appeared in the newspaper press, there are a few shortcomings, errors, or omissions, in reference to old events, which it may be allowable for one, even here, to note, who was intimate with him, and honoured with his friendship, as I was, at a time when the baker's son had not many friends. One of these notes is in reference to his great discovery of the anæsthetic power and use of *chloroform in child-birth*. That others preceded him in the use of *ether in tooth-drawing*, or even in other surgical operations, may, doubtless, be the fact; as it was, indeed, that Sir Humphrey Davy had, many years before, called attention to nitrous oxide, as a power which had rapt him up, out of the fleshy and pain-feeling state, into the quasi-spiritual; and induced him, while in that state, to announce, as an "infallible" oracle, that "nothing exists but ideas." That Simpson, however, was the exclusive originator of the professional practice of destroying pain in child-birth; and had the idea, too, of doing so, previously altogether to Morton the American dentist's professional experiments with ether in 1846, the writer of the present note for one can testify. Before that time, Simpson and he were associated in an investigation into the reality or falsity of artificial *entrancement*, by what is called mesmerism; as many of the most noted citizens of Edinburgh, who witnessed our joint experiments, well knew; and, although some of these,—such as Sir William Hamilton, Dr. Combe, and others,—are now dead; others, such as Mr. Robert Chambers,—and Professor Balfour, of the Edinburgh University, who kindly introduced me to Dr. Simpson,—still live. So, I presume, does Mr. James Gall, son of an early inventor of a system of printing for the blind, who took part in our investigation; as also, for a time, did the late Mr. W. B. D. D. Turnball, Advocate, or Scottish Barrister, but lately of the Rolls Office, London, a family connexion of mine, whose persecution in the House of Commons by the Exeter Hall patrons killed him.

Now, at that time, or between 1835 and 1840, Dr. Simpson steadily entertained the idea of using the "deep sleep" and pain-killing power of artificial entrancement in midwifery, or for the facilitation of the natural birth; while my object had a curious antithetical co-relationship to that, as *it* related to an investigation of the *spiritual* birth of the life of entrancement itself, which has since been more fully carried out at Glasgow and London. A writer in the *Scotsman* newspaper, ignorant of Dr. Simpson's one grand object even at that time, thinks proper to speak of him in terms of regret, and almost censure, that he should have dabbled, idly, as he seems to think, or without a direct purpose, in what was then (if it is not still) a sort of tabooed line of research amongst medical men. Simpson's unconcealed experiments, however, only showed his steady purpose, and his superior sagacity and moral courage, although he failed to render either artificial entrancement, or ether, or nitrous oxide, subservient to that grand and destined purpose of his life. It was to him quite a secondary matter, certainly; but I have seen him also experimenting on the possibility of performing surgical operations on the entranced, by singeing with a red-hot poker the eye-brow and the flesh of entranced patients in the Lock Hospital, at Edinburgh, of which he was at that time the superintendent. And neither did he spare himself in his experiments with chloroform; for before any other human being had ever been rendered insensible by it, he tried it on himself and his assistant; and his first knowledge of its levelling power was acquired beneath his own table, where he found himself lying when he "came to himself." This anecdote I have long known, although I had by that time left Edinburgh, and did not witness it. I mention it now because I have not seen it stated in any of the numerous memoirs of him at present in circulation. Nor have I observed another interesting anecdote of Simpson, with reference to his election by the Town Councillors of Edinburgh, as successor to Dr. Hamilton, the Professor of Midwifery in the University there, which election I had the pleasure of promoting through friends of the councillors. There was a strong opposition, and the election was at one time very doubtful. A serious objection to him as Professor of Midwifery was that he was not a married man. This "bull" Simpson at once "took by the horns." He immediately prepared a house for his intended bride, a most attractive and amiable lady, a cousin of his own, whom he had long previously, I believe, selected as his choice; and at his "house heating," before his marriage, I had the honour of taking a prominent part. His marriage then took place; and, no doubt, to the surprise and mortification of some of his opponents, the serious objection that he was unmarried no longer existed at the time of his election.

JOHN E. DOVE.

KENSINGTON GORE ROAD, HALL OF ARTS, AND THE PARK.

THE proposed change of roadway and elision from Hyde Park of an elongated strip of 25 yards in width by 500 yards in length, from the Queen's Gate to the Prince's Gate, have caused much public anxiety, and even more serious alarm to the residents of the now extensive and fashionable vicinage of South Kensington.

As the stupendous Colosseum approaches completion, and the lustrous monument to Prince Albert will soon be divested of its scaffolding, some alteration of the roads and grounds have doubtless become requisite; but the conversion (now in progress) of the old ride along the flower-walk into shrubbery, and the substitution of a new driftway from the Serpentine Bridge to Exhibition-road, not only met the difficulty, so far as the monument is concerned, but effectuated a great public accommodation.

What now seems to be desired is to divert this the principal thoroughfare at the West-end, so as to remove it a greater distance from the Hall of Arts, and to make it quadrate with the Horticultural grounds and conservatory, with which the longitudinal axis of the Colosseum is at right angles. It would be well to have an enlarged footway in front of the portico and chief entrances on either side of this magnificent structure; and if this can be done without invading popular privileges of park, and, above all, without removing a range of fifty ornamental and nearly full-grown trees, surely the Commissioners may feel satisfied, even although the enlarged road and pathways may not critically square with their oval.

If the long reach of park required should be conceded to them, adieu to the sylvan and ornate character of this portion of Hyde Park. Not fifty, but nearly double that number of vigorous and umbrageous foresters must be displaced, to be lopped 20 ft. up the stem, bandaged as those in Park-lane have been for two years, so as to attain afterwards a sickly vegetation; and all this at an enormous expense and waste of woodland scenery.

Having, many years back, given, through the *Builder*, hints as to the removal of the old park wall along Piccadilly, and the preservation of the dozen planes *which now grace the footway*, as on a Parisian boulevard; and since that time (about 1858) having recommended, through the same source, the widening of Park-lane, and *its extension through Hamilton-place*, at the same time showing that the range of about thirty vigorous and spreading planes might be left in the park-side footway; perhaps, although my views in the latter case were not fully agreed with, I may be allowed to suggest a plan which may meet with general approval, and possibly reconcile difficulties "*de part et d'autre*."

To cut away and desolate three or more acres of the park, in this its most valued part, cannot be tolerated; while to utilise a narrow strip, without disturbing a branch, if it tend to general enjoyment and convenience, may meet the difficulty.

In brief, then, my plan is to leave every tree as it is.

The outer row of elms, with some planes, chesnuts, and birch, number fifty-five between the Queen's Gate (Albert-road) and Prince's Gate; and thence to the barrack stables there are ten more. This range of vigorous foresters, well spread, and in height from 30 ft. to 50 ft., stand, on an average, 6 ft. inside the park rails, two only being within 5 ft.

The park-side footway averages a width exceeding 12 ft.

The driftway varies from 44 ft. to 34 ft., and the paved footway on the south side from 8 ft. to 10 ft., giving an entire width of causeway, in some parts of 55 ft., and between Albert and Exhibition Gates of 74 ft.

Now, it is quite clear that, if the present railing were withdrawn parkward, and ranged 18 ft. inside the row of trees, forming a gravel walk of that width (shaded also at intervals by many old standards), the width of the present external footway, together with the interval of 6 feet between the tree range and the now-standing fence, would increase the carriage driftway by 20 ft., and thus leave ample scope for widening the paved footway on the south side: thus an external footway of 18 ft. (besides the diameter of the growing trees—say, 2 ft.) might be secured to the public, without any apparent loss of extent in the park grounds, whilst such an arrangement—*vide* Park-lane, *vide* Birdcage-walk—would rather give apparent extent to the park, at the same time conferring improved value on the vicinage and inestimable solace to those who wend their way afoot.

The site and direction of the Queen's and Rutland Gates would appear to favour such an adjustment, as they both stand back (inward) from the line of railing; viz., Queen's Gate 18 ft., and at Rutland Gate the railing curves outward 15 ft. towards the cavalry stables.

As to the Guards' barracks, their structural unfitness for troops, the incalculable damage they inflict upon the grandest site of the western metropolis, the impossibility of extending improvements towards Knightsbridge whilst they are continued there,—this part of the subject has been fully treated years past in the *Builder*; it is therefore deferred, only remarking now that the position and aspect of the officers' quarters, mess-rooms, &c., may, in some degree, strengthen the position; otherwise, Chelsea, for cavalry, would surely be near enough, if our Foot Guards find it agreeable.

QUONDAM.

CARLISLE BRIDGE, DUBLIN.

IT has been stated that the design by Messrs. Lanyon & Co. is to be carried out at the estimated cost of 60,000*l.*; and the citizens of Dublin are inquiring why Mr. Charles Geoghegan's plan, which would give all they want for 30,000*l.*, Messrs. Courtney & Co. having offered to do the work for that sum, should be superseded. We have not yet seen any sufficient answer to this inquiry.

FAILURE OF COLUMNS, ST. SWITHIN'S, LINCOLN.

WE are informed that the pillars in the church now building in the old Sheep-square, Lincoln, have failed. The local *Gazette* says the parish committee has examined the pillars, and not only are they of opinion that they must be taken down and rebuilt, but the architect (Mr. Fowler, of Louth) coincides in this opinion. A few days ago a meeting of the Building Committee was held in the vestry, and it was determined that the blame attached to the architect, and he was required to pull down the interior pillars, and rebuild them at his own cost. To this resolution Mr. Fowler demurred. He admitted that the pillars must come down; but he did not think that he was called upon to rebuild them. On Friday morning another meeting of the committee was held, and Mr. Fowler admitted the necessity for immediately pulling down the pillars, which have cracked in all directions, but affirmed that the cause of their giving way must have arisen from accident, or from bad workmanship; whilst several members of the committee insisted that the giving way of the pillars was caused by the material that had been used.

After discussion, it was ultimately resolved that Mr. Christian should examine the pillars, and report the cause of the failing. If the cause arise from improper design, or from the material used being inadequate to bear the superincumbent weight, then the architect is to bear the cost of rebuilding; but if the defect arise from bad workmanship, then the cost of rebuilding is to be borne by the contractor,—the costs of the reference to follow the decision. This resolution was agreed to by the architect and Mr. Lovelee, the builder, and both parties signed the resolution.

TUNBRIDGE WELLS INFIRMARY.

THE re-opening of the Infirmary here has just taken place. It is situated in Grosvenor-road. The building has been renovated and enlarged, under a contract with Mr. Strange, builder. Almost three-fourths of the place have been built, the old infirmary being composed of nothing more than ordinary rooms, which are now enlarged to good-sized dining-rooms, and capable of accommodating twenty-four persons. Some new rooms, however, have been added, and taking all the rooms into consideration, accommodation can be found for thirty-eight persons. There are two men's wards, 16 ft. by 46 ft. and 14 ft. high, to which are attached bath-rooms on the first floor, and laboratories on the second. In conjunction with these there is a man's day-room, furnished with carpets, pictures, tables, chairs, &c., by the Hon. F. G. Molyneux. This room is to be used by the convalescent, and for their amusement several games are provided. There are two women's day wards, furnished by Lady Georgiana Molyneux in a similar style. Clocks have been presented to each by Mr. and Mrs. Molyneux Williams. There are three convalescent wards, but they are rather small; a large waiting-room for out-patients, and three consulting-rooms. There is likewise a private set of rooms for the matron and resident surgeon, with bedrooms adjoining. There is a large wash-house, with laundry, cooking-kitchen and scullery, larders, cellars, and store-rooms. In the hall a lift has been invented, 7 ft. by 5 ft., to take up three at a time,—the patient and two assistants. On the opposite side is a lift of smaller dimensions, for sending up dinners, &c. There are a great number of pictures in all the rooms, and quotations from Scripture.

METROPOLITAN BUILDINGS BILL.

IT is unnecessary to pursue our comments on the Bill before the House, as we have no doubt it will be withdrawn. We have before us several letters on the subject, and some observations by Mr. John Liddle, the Whitechapel Medical Officer of Health; but it would be useless to print them. The Board of Works must be more careful next time. This is not the first withdrawal, and such work costs money.

PARLIAMENTARY.

New Law Courts.—In answer to Mr. Alderman Lawrence, Mr. Ayrton said he was unable to place block plans of the New Law Courts in the library of the House until they received the sanction of the proper authorities.

Leicester-square.—In answer to the same hon. member, Mr. Ayrton said that some years since an Act of Parliament was passed, enabling the local authorities to take possession of any vacant space in the metropolis for which an owner could not be found. The local authorities had done so in the case of Leicester-square; but an owner at once turned up, and established his title. The square, therefore, being private property, nothing could be done until they found a law enabling them to dispossess the owners. The sooner the better, add we.

Workmen's Inventions.—In reply to a question from Mr. Hughes, the Attorney-General stated that proper steps would be taken to protect the unpatented inventions of workmen in the forthcoming International Exhibition. He believed that the Act of 1865 would be insufficient, in consequence of the interpretation that had been put on it that when a workman exhibited an invention another person might take out a patent for it. He proposed to introduce a short Bill, giving the workman protection for his invention for six months from the commencement of the Exhibition. He had arranged with the secretary of the Exhibition for a list of the inventions of workmen to be exhibited.

The Supply of Water.—Mr. Whalley asked the Home Secretary, with reference to the recommendation of the Royal Commissioners that the supply of water in the metropolis should be on the system of constant instead of intermittent supply, whether it was the intention of the Government to adopt any and what measures, with a view to giving effect to such recommendation. Mr. Bruce said that the Royal Commissioners went much further than the mere question of the intermittent or constant supply of water. They proposed that all the property of the private companies should be transferred to a central body, and that from that time forward every householder should be obliged to take water on the condition that he was constantly supplied. The necessary preliminary to giving effect to that recommendation was to create a central authority. He had been in communication with the Metropolitan Board of Works, and he had come to the conclusion that this measure could only be properly carried into effect when the measures for creating a general municipal government for the metropolis had been matured.

BARRACKS IN WINDSOR.

THE British soldier in full training is an expensive article. We are reminded of this fact year by year as the army estimates are brought forward in the House of Commons. Whether he be an article of necessity or of luxury, it is not within our province at present to discuss. If it be true of the army generally that it entails heavy expense, it is more especially so of that portion of it known as the household troops. The duties of the regiments of guards in ordinary times never extend beyond our own shores, and seldom to any other places than the metropolis and the royal borough of Windsor. The only exception to this is, perhaps, an occasional month under canvas at Aldershott. The household brigade is admitted, and deservedly so, to be the *élite* of our army. In dress, drill, and equipment it is unequalled. It is not often that we indulge in any grand military show, but whenever this is done, our guards form a sight of which any Englishman may well feel proud.

But although we have always been careful to have these troops well clothed, well fed, and have maintained their equipment and drill at a high point of excellence, there has until lately been one great defect. The barrack accommodation for this portion of our military force was not only not the best, but was certainly below the average. This was especially the case at Windsor, where both the cavalry and infantry barracks were defective and insufficient. It had become a well-known fact that the rate of mortality in these regiments was much too high. Taking into account the care exercised in the selection of recruits, and that these troops had not to endure any of the hardships more or less incident to the life of a soldier, the high rate of mortality among them could only be accounted for in one way. It could only arise from the inferior accommodation afforded by such barracks as those in Sheet-street, Windsor, or Portman-street and Charing Cross in London.

The matter having, of necessity, forced itself on the attention of the military authorities, inquiries were instituted by the War Office. This led to a determination to enlarge, remodel, or, as in London, to remove the barracks to more eligible situations, in order to secure the better health and longer life of the guards. It was, therefore, determined to make very extensive alterations as well as additions to both cavalry and infantry barracks in Windsor; and in the present paper we purpose giving some account of what has been done to the latter.

What must now be called the *old* barracks had its entrance in Sheet-street, at a point where the street was narrowest. It occupied nearly the four sides of a quadrangular site, the entire area of which was a little over a third of an acre of ground. The parade-ground (if it deserved the name of one) covered a space of about 2,000 square yards, and was scarcely large enough to muster the troops in garrison. The main block of building faced Sheet-street. It contained thirty-two rooms, measuring some 50 ft. by 21 ft., and about 10 ft. in average height. Each of these rooms was occupied by twenty-eight men, thus giving a superficial area of 40 square feet, or 400 ft. cubical measure, to each man.

It will thus be seen that the men were huddled together in very insufficient space; and it could hardly be wondered at that their health suffered in consequence. Nor did their officers fare much better; for their quarters were of a description not at all befitting the rank and position of the gentlemen usually holding commissions in the Guards' regiments.

Then, again, there was no accommodation whatever provided for the married soldiers. These were obliged to live out of barracks, either in lodgings or in small cottages, wherever they could find them in the town. This was not only very inconvenient, but often entailed a heavy expense on the men themselves.

It will be readily supposed, that in a space so confined as that we have described anything approaching to free exercise or recreation was out of the question. As a natural result following this, a considerable proportion of the men were often found either incapacitated for duty by actual sickness or showing that want of robust health which always, more or less, marks those who live in confined spaces.

It may reasonably be doubted whether any other European government would have suffered its choicest troops to be accommodated as our Foot Guards were at Windsor; and hence our national credit was somewhat at stake. Although many royal and distinguished visitors came to the royal borough to see its castle and the attractive scenery around it, or to be the guests of Her Majesty, yet amongst the many sights worthy of their notice we could never include the infantry barracks, except it had been to disgrace us in the eyes of those who saw it. Now, however, all this is changed. It is well known that the Queen has taken a deep personal interest in what has been done to secure the comfort and health of the troops. To do this a large outlay has been absolutely necessary, both in the purchase of ground and in the erection and alteration of the buildings; but, even financially considered, this outlay has been a wise one.

Previously to the alterations there stood in Sheet-street, and close to the barracks, a block of old, decayed almshouses. These being sold, the War-Office secured the site, with a view to commence the necessary alterations. Behind the main block of the barracks, which we have already described, was a narrow lane, and, further in the rear, a large space occupied as gardens, in which stood some eighty or ninety one-story cottages. Most of these were little better than hovels, and were simply a disgrace to the town. The authorities at the War-Office ultimately succeeded in securing the whole of this space, and shortly afterwards the whole of the cottages were cleared out, to commence operations.

The additional area of ground thus acquired amounted to nearly five times as much space as that of the old barracks, its parade-ground included. Since then an additional site, occupied by a public-house known as the Five Bells, has been purchased, at the southern extremity of the old barracks.

The first part of the undertaking was to provide the much-needed accommodation for married soldiers. The block for this purpose was erected partly on the site of the old almshouses already mentioned, having its end abutting on, and the block itself standing at right angles to, Sheet-street. The contract for this was taken by Messrs. Myers & Sons, of London, and it is substantially built. It is quite plain in style, if we except the outside galleries, by which the rooms of the upper stories are reached. The block is three stories high, and access to the second and third is gained by a common staircase leading to the galleries. These galleries are constructed of iron, supported by pillars, and give the whole a very neat if not ornamental appearance. Accommodation is provided for thirty-two married soldiers, each occupying one room; the dimensions of which are 16 ft. by 13½ ft., and 10 ft. in height, thus giving a cubical space of 2,160 ft. The rooms are each provided with a small cooking-range, with oven. The water-supply consists of three tanks, two of which hold 430 gallons each, and the remaining one 800 gallons. Each room is lighted from both sides. The arrangements for ventilation are very simple, but in practice are found effective. In fact, there is more reason to complain of draught than of want of ventilation. A separate shaft for each room carries away the foul air to the top of the building, while fresh air is admitted from each side by means of perforations.

The second part of the undertaking, and included in the same contract (about 14,000*l.*) was the erection of quarters for the staff-sergeants and sergeants. This block, which stands on the north side of the new quadrangle, has somewhat greater pretensions to architectural taste than the one already described. It contains thirty-two living-rooms, besides the mess establishment. Fourteen of these are occupied as double rooms by those entitled to this privilege, and the remaining eighteen as single rooms. The mess-room is one of fair proportions, measuring 42 ft. in length by 24 ft. in breadth, and 14 ft. in height. With its draped windows, its walls decorated with engravings and photographs, its billiard, bagatelle, and writing tables, it wears an air of comfort very much in contrast with old quarters occupied by these officers. Behind the mess-room is the kitchen, admirably fitted up with everything that such a place requires. Near to it are the cook's room, the larders, cellars, and other necessary conveniences. Water is supplied from four cisterns, and there are sinks and water-closets on each floor. The height of the rooms and the arrangements for obtaining ventilation, along with the other improvements introduced, cannot fail to have a beneficial effect upon the health and appearance of the officers, as well as upon their wives and children. Nor will the social and moral effect be less pleasing; for here they can have enjoyment and recreation, such as will, it is hoped, be preferred to spending time and money elsewhere.

When this block had been completed, the guard-house block was commenced near the new entrance in Victoria-street. Meanwhile, the whole of the new area had been walled in with a panelled wall 14 ft. in height. The guard-house buildings are only one story high, and include a room for holding courts-martial, a room for the commanding officer, an orderly-room, a guard-room, and a lock-up with five cells. Behind these is an enclosed exercise-ground, for the use of prisoners who are in custody. Outside the two frontages of this block are raised pavements, which are roofed with rough plate glass, the framework being supported on pillars in front. These are available as a sentry parade in wet weather, and as a protection for those on duty at the guard-house. The contract for this was also undertaken by Messrs. Myers & Sons, the cost being about 2,000*l.*

The new entrance-gates are of open ironwork of an ornamental character. The two gate-pillars are of considerable height and are surmounted by large globular gas-lamps, which give a finished appearance to the entrance, strongly contrasting with that lately used.

Between the married soldiers' quarters and those of the sergeants already described another block of building, corresponding in architectural features with the latter, has been erected. This includes the canteen establishment, the reading and recreation rooms, library, &c. The canteen occupies the portion of the building to the right of the main entrance. Its arrangements are carried out on the co-operative principle. The profits are divided amongst the men in proportion to the amount of purchases made by each. The canteen not only supplies ale, beer, and spirits, as was formerly the case, but also groceries, vegetables, and other necessaries. The soldiers avail themselves of the advantages offered to a large extent.

To the left of the main entrance is the recreation-room, with the reading-room and library over. These rooms are large and well-proportioned, being lofty, well lighted from both sides, and ventilated. The recreation-room is furnished with every convenience. There are billiard and bagatelle tables, chess and draughts, dice, dominoes, and cards.

The reading-room is over the recreation-room, and is of the same size and proportions. On entering, it presents a very pleasing appearance. On the walls are hung a variety of maps and useful diagrams, and the tables are well supplied with newspapers and periodicals. There are also provided tables, with writing materials. Artificial light is supplied in the evening by a brilliant sunlight burner near the ceiling. A small room on the same floor is devoted to the purposes of a circulating library.

There are rooms in this block for the librarian and the sergeant who has charge of the canteen. The entire block forms what may be rightly designated a soldiers' club, and as such the men avail themselves of it. Throughout the whole of the arrangements here their comfort and convenience have been carefully studied. The block is supplied with water from a tank containing 6,500 gallons.

The work for this part was undertaken by Messrs. Piper & Wheeler, at a cost of about 5,000*l.*

On the south side of the new quadrangle, and opposite to the building now described, the main block has been erected. In this there are twelve large rooms, each being 76 ft. in length, by 22 ft. in breadth, 12 ft. high. Each room has accommodation for 24 men. It will thus be seen that for each man there is a superficial area of 70 ft., and over 800 ft. cubical space, as contrasted with 40 ft. superficial, and 400 cubical feet in the old barracks. If nothing more had been done, there can be little doubt that this alone would have very much improved the health of the troops.

The block has two principal entrances, and is three stories in height. Opposite the entrances are the staircases, and on either side, as well as on the landings above, are rooms for the twelve sergeants who have charge of the men while in barracks.

The sergeants' rooms, which measure 15 ft. by 12 ft., and 12 ft. high, are so arranged that they command a full view of the larger rooms in which the men live and sleep.

The rooms are warmed by stove grates, invented by Captain Galton, late of the Royal Engineers, and with which some of our readers are doubtless familiar. The object of the invention is that of a better utilisation of fuel and heat. This is accomplished by having an air-chamber around the back of the stove, to which pure air is admitted from without. This air, after becoming warmed in the chamber, is delivered into the room. The foul air is carried off by ventilating shafts. Each of the large rooms has two of Galton's stove grates, while each sergeant's room has one.

There are ablution-rooms, fitted up with every convenience, latrines within the building for night use, and others outside, at the back of the block, for day use. An abundant supply of water is secured. For the water service of this block there are six slate cisterns, each capable of holding 500 gallons. In addition to these there is a large iron tank, holding 3,500 gallons. This is used principally for supplying the baths.

Along the front of the building there is a covered parade, formed of pillars and iron framework, and glazed with rough plate, the latter being protected by wirework. The erection of this block was entrusted to Messrs. Piper & Wheeler. The contract also included the erection of a new cook-house, bowling alleys, and magazine, &c., the amount being from 12,000*l.* to 13,000*l.*

To the west of this block, and on the same side of the quadrangle, stands the magazine, and beyond this the officers' stables. At the eastern extremity is the new cook-house. In this is an oven capable of cooking rations for 200 men, and a smaller one for 100 men. There are also eight boilers, each cooking for 50 men. These boilers are supplied with water from a large tank placed immediately over them. The old block used for cooking, which stood at the north-eastern corner of the quadrangle, has been entirely removed, thus giving an uninterrupted view of the whole of the barrack buildings. Near the cook-house there are store-houses for meat, bread, vegetables, &c. The ground to the rear of this, formerly the site of the "Five Bells" public-house, has been used for the erection of a new armourer's shop, fitted up with forge, browning trough, and stands for ninety rifles. There have also been built a block for laundry purposes, with all necessary fittings, a bedding store-room, a coal-store, and other useful offices.

Previously to finishing the latter portion of this contract, the quadrangle was made complete in its buildings by the erection of the officers' quarters. These are of very handsome architectural appearance, and consist of a centre portion, flanked by square towers and two wings. The basement is well arranged as a department for the messmaster. The cooking kitchen is replete with apparatus, all of modern construction, so that there is every convenience for steaming, boiling, baking, broiling, roasting, frying, and all other operations of the culinary art. A small lift is used for passing the dishes up to the mess-room above. In connexion with the messmaster's department there are his living-rooms, and all the necessary store-rooms, offices, and wine-cellars.

The ground-floor of the block is raised about 5 ft. above the ordinary level. This adds very

much to the general effect of the façade. The centre part is used as a mess-room, and is certainly one of the handsomest in the country. On each side are entrances, reached by flights of steps, leading to the mess-room, the principal staircases, and the officers' private rooms. Over the mess-room, and of the same size, is the billiard-room. The block contains accommodation for twenty-two commissioned and four field officers, besides the quartermaster, who has two rooms and a kitchen. The water-supply is obtained from a tank at the top of the building, containing 5,000 gallons. This portion of the work was contracted for by Mr. W. Higgs, the estimate being about 14,000*l*. The work is very substantially done and well finished.

A considerable portion—about two-thirds—of the quadrangle enclosed by the buildings now described has been levelled and laid with grass turf, while the portion near the officers' quarters has been planted with evergreens. The spare ground near the wings of this block is also planted as ornamental shrubberies; the remaining portion is levelled and laid with gravel, and is used for drill and parade purposes.

In the old block, the back of which now forms the eastern side of the square, and previously mentioned as containing thirty-two rooms, a considerable improvement has been made. It now accommodates, not only a much less number of men, but has undergone alterations to add to their comfort. Projecting from what is now the back of the building, four blocks of ablution-rooms have been built. These are supplied by a tank containing 5,000 gallons. The lower portion of the building, part of which was formerly the officers' mess-room, is used as a band-room and for other purposes. In the old block in the square the guard-room, orderly-room, and engine-house have been removed, and in place of these has been erected a gymnasium.

The dimensions of this room are 80 ft. in length by 40 ft. in breadth, and some 20 ft. in height. A portion of the length (about 15 ft.) is occupied by a vestibule, on the right of which is a dressing-room, and on the left a room for gymnasium sergeant or instructor. Over these three is a gallery for spectators, with an ornamental railing in front. The gallery is reached by a staircase from the vestibule. The large room, or gymnasium school, as it is more appropriately named, is well lighted with windows from both sides, and has also a large octagonal lantern in the centre, with sashes which can be lowered for ventilation. The artificial lighting is secured by six groups of gas-burners, with reflectors fixed close to the side walls, so as to be out of the way of the various athletic apparatus with which the school is filled.

This apparatus consists of a large mast, which rises from the floor to the top of the lantern. Around this are arranged a series of ropes for climbing. Some of these latter are plain, while others have knots, wood roses, pegs, and other projections to assist the climbers. There are other ropes attached to the beams, fitted as a trapeze, and others, again, with rings for swinging. A row of each is fixed on each side of the room. A strong walking-bar, as thick as a small mast, is fixed horizontally in a strong, oak frame, in which it can be raised or lowered, and is used for teaching the men to balance themselves where only a narrow foothold can be had. On the right of the room single and double sets of climbing-poles are fixed at an angle of about 45 degrees, while similar poles hang vertically in the centre, to be used in a similar way to the ropes. A strong, iron rod, well supported from the roof, extends for some distance on the right, and can be used by a large number of men at one time. Beyond the climbing apparatus stand the parallel bars. Near these are the vaulting bars, moveable to various heights, in a frame.

On the left hand, and extending almost the whole length of the room, is fixed, horizontally, the elastic ladder. This consists of two wire ropes, between which are fixed staves, or rounds, at equal distances throughout its entire length. The staves are round, with square bosses at the ends, these latter being fixed firmly in brass sockets, to prevent them slipping or turning round when grasped by the hands of the gymnasts. The whole is raised some 7 ft. from the floor, and tightly stretched. On the same side are fixed two inclined planes. One of these, called the ladder plank, has spokes projecting from each side, by which the gymnast can draw himself up either with his face or his back to the board, either of which will give fine exercise for the muscles of the shoulders, arms, and chest. The back of this can also be used for climbing with the arms alone.

The lower end of the room is occupied with a bridge-ladder, extending across the room, the extremities being vertical, the centre portion forming two inclined planes, and between these are horizontal portions.

The wall at this end of the room has been prepared and fitted with apparatus for escalading purposes, such as scaling the walls of forts, either by the hands alone, or by means of grappling-hooks. On each side of the room are large vaulting-horses. In different parts of the room mattresses are laid on the floor.

A space is left clear at the entrance of the room for sword-practice, fencing with foils, single-sticks, as well as the use of the bayonet. There is an ample supply of boxing-gloves, masks, cutlasses, swords, and dumb-bells. These later range from 10 lb. to 50 lb. in weight. In addition to the ordinary dumb-bells, there are French barbells, of from 20 lb. to 60 lb.

The entire fittings of the room are as complete as the most enthusiastic athlete could desire. There can be no doubt as to the benefit in health and physical development which the men will derive from the frequent use of the means thus provided.

Some alterations have been made in the old officers' quarters, to adapt them to new purposes. One part has been fitted up with galleries, desks, &c., and is now used as an infant school, and suitable accommodation has been provided for the school-mistress. Other rooms are used by married soldiers, engineer officers, and others connected with the barrack establishment.

It only now remains to speak of the drainage. The whole of the barrack property is drained into the main sewer of the borough. For some time past plans have been discussed before the Local Board of Health with reference to a new system of drainage and means of diverting the sewage from the Thames. The conservators of the river require that it shall cease to be polluted. Surveys have been made with the view of adopting the "separate system" of Mr. Menzies. When the new ground was acquired for the extension of the barracks, it was decided to lay in drains on the "separate" plan. There are, therefore, a double set of drains; one taking the surface water or rainfall, the other the sewage proper. At present both these pour their contents into the main sewer, but are so arranged as to be separated at any time.

With all the improvements and additions we have described, not only do the Windsor Infantry Barracks form a pleasant contrast with what they once were, but the general appearance of that part of the town has been improved. It has given the authorities of the town the opportunity of opening up a wide road leading from Victoria-street to the Prince Consort's Model Cottages, which will, no doubt, be continued to All Saints' Church and Frances-road.

ANTHOLOGIA TECHNICA.

ANENT rats. "Rats!" exclaims the reader; "what the deuce have rats to do with art?" A great deal, sir, as every professional architect or builder knows to his annoyance and cost. However, it is with the historical instead of the building rats we have to do this time.

Our *ego* speaks for us. Dr. Jackson, a prebendary of St. Paul's, has lately published a work for the young, entitled "Our Dumb Neighbours," with the laudable design of implanting knowledge and kindly feeling towards animals.

A contemporary says, "Dr. Jackson remarks it is strange that no classical writer has ever mentioned 'rats,' which, he says, first visited us from Asia in the fifteenth century."

Well, we shall prove that "rats are as historical as the Pyramids, and that architects are aware that Vitruvius has alluded to them among others. If the learned Canon, or his less erudite critic, had hunted up authorities, he would have read the "Batrachomyomachia" of Aristophanes. *Mus* was the generic term for rats and mice in the days of Homer, who first gave birth to the legend of the mountain in labour and the mouse.

Ὠδινεν ὄρος, Ζεὺς δ' ἐφοβεῖτο, τὸ δ' ἔτεκεν μῦν.

(The mountain was in labour. Jupiter got frightened; but it brought forth a mouse.)

A line imitated by Horace in the 139th line of his "De Arte Poetica":—

"Parturiunt montes: nascitur ridiculus mus."

Dr. Jackson ought surely to have known the Latin word as *sorex*, a rat, and that Colonius has written of the *Mustella Alpina*, the Alpine or mountain rat; or the *Mus Indicus*, or Egyptian rat; the *Mus Pharaonis*, the wonderful little ichneumon, which, from the time of Ptolemy down to the days of Champollion, has the credit of visiting unbidden the inner apartments of the sleeping crocodile, when he found the monster's door open, and killing the villanous saurian by devouring his vitals.

In Plautus, too, who merits the name of a "classic writer," these words are met with,—*Toricina Nænia*, the squeal or squeak of a rat when caught in a trap; Nenia, in the mythology, being set down as the goddess of funerals, and by Metonym as signifying a dirge or death-wail. And brave old Vitruvius, speaking of the villas of Baiæ, the Roman Brighton, suffering from the inroads of the *mus aquaticus*, and inviting the workmen to a grand *battue sorices insectari*, to hunt the rats, telling the *musicidi*, or rat-catchers, how to make a *soricum decipulum*, or rat-trap; and does not the word *suboleo*, or the more refined term *persentisco*, manifest that the ancients knew how to "smell a rat"?

Bravo, *ego!* you have made out a case. When learned doctors undertake to teach the young, they ought, as a preliminary, to "read up."

Archery was once a fashionable, as well as an indispensable accomplishment in the British islands. It is not unlikely to become fashionable again, and it is a more healthy and bracing employment for the fair sex than croquet. As a military resort, it is extinguished for aye, although prior to the invention of fire-arms the bow was the principal missive weapon. Its use is coeval with society. In modern times there were three forms of bows in use,—the Roman bow, the long bow, and the cross-bow. The former was about 3 ft. long, used generally on horseback, and drawn to the breast. It was the general weapon of the Scythian, after whom it was sometimes called the Scythic bow. It was also in use among Germans, Britons, and Celts (Irish). The cross-bow, or *arbalète*, was the more favourite weapon of the French. It was fixed on an axis or shaft, and was from 1 ft. to 3 ft. long. The favourite weapon of the English was the long bow, from the thirteenth to the sixteenth century. "Drawing the long bow," is a saying well understood to-day. The English were not the original inventors. The long bow was a formidable military weapon, and it is said owes its origin to the Hindoos. It came into use in Europe, perhaps, about the time of the Crusaders.

The English were expert at the use of the long bow. The long bow and broad arrow played sad havoc at Agincourt and Cressy. Even after the introduction of firearms, the English had bowmen in the flanks of their armies. By a treaty between Charles IX. of France and Queen Elizabeth, 1572, the latter was obliged to furnish the former with 1,000 English archers, and in 1627 the English shot arrows into a fort, on the Isle of Rhe. After this archery became almost obselete. Clubs or companies, however, kept the custom alive. London had its "Finsbury Archers," Dublin its "Archers' Club," and Edinburgh its "Royal Company of Archers."

Evidences are again cropping up tending to confirm the belief that another race of people occupied the central portion of North America before the present, and that they quarried, built, and manufactured, and were proficient in several of the arts. Now none of the Indian races have been known to mine or throw up intrenchments or to raise huge cairns or heaps of stones in commemoration of their battles. A Mr. Bartram, who was a professor in the College of Philadelphia at the close of the last century, instances these monuments and fortifications, but he was not the first. In the *Journal des Scavans* for March, 1681, are to be found statements from the memoirs of John Leder, of Hamburg, who was a resident in America for ten years, but we are not informed who this early race of people were who inhabited America. Nor do we get any great clue or sane conjecture. An anonymous writer, who also alludes to the above authors, says:—"It is probable part of the speech of these ancient people was adopted by their successors, as some of the Celtic is now found in the German and Gothic tongues."

We are inclined to believe that the American continent received inhabitants from Europe long anterior to the time mentioned in our histories. The first navigators found a large population in

Mexico and Peru. Whence did they come? It is not unlikely that the great American continent received its first contingent from other quarters besides Europe. We want some light yet about the primal population. Were they a separate creation?

Embalming has something to do with the history of monumental architecture, so we shall have a word to say upon it. The Egyptians were great at this art. We are told that St. Austin, coming into Egypt, was surprised at the sight of Ptolemy and Alexander the Great so fresh in their sepulchres. A fixed alkaline salt was first used for the purpose, and afterwards balsams. The Romans were nearly as expert at embalming as the Egyptians. A body found in the Appian Way in the time of Pope Paul III., was floating in some unknown kind of liquor, with a perpetual lamp at its feet burning, the hair fresh and yellow, and the other parts firm and entire, though buried 1500 years. The inscription declared it to be Tulliola, Cicero's beloved daughter. Claudia, a celebrated embalmer of the seventeenth century, made a strong solution of fixed alkali in water, and in this he let the body lie for two or three months, according to its size, and then dried it in a stove. More expeditious, as well as more elaborate modern methods are in use now, but we are not inclined to describe them. We are more interested as sanitary and social reformers in the preservation of the health of the living, than the embalming of the dead. The moth will conquer the greatest ingenuity of man in the end, and the inevitable laws of nature will at last stand confessed, amid the crash and ruin of worlds,—"Ashes to ashes, and dust to dust."

The building craft contributed something to the perfection of timekeepers. John Harrison, an Englishman and a carpenter, led the way in clocks and chronometer watches; and he was the first and most successful in constructing timekeepers for telling and correcting the longitude at sea. In 1726, as a working carpenter, he made two clocks, chiefly in wood, to which he applied an escapement and compound pendulum of his own invention. These went well for ten years, scarcely erring a second in a month. The motion of the pendulum being liable to derangement if used in a ship at sea, Harrison set himself to construct a watch, which was used in a voyage to Lisbon and back. So correct did it keep the time that it corrected an error of a degree and a half in the ship's reckoning. After this, Harrison's other attempts were more and more successful, and obtained premiums to the extent of 20,000*l*. In 1772, Harrison made a timekeeper for the king's private observatory at Richmond, and at the end of ten weeks it varied only four seconds and a half.

There is a good interval between Richmond-hill and Harrison of 100 years ago, and Ludgate-hill and Benson, the country carpenter and the wealthy citizen chronometer maker. Such men as the carpenter Harrison are pioneers of civilisation and builders of nations.

Earth houses, or rather dwellings in the earth, are of very ancient origin. They exist in many northern countries. Numbers of them have been discovered at different periods in Ireland, England, and Scotland. They were used as places of safety or refuge, to which the early inhabitants could retire, carrying with them their provisions and effects. In the Irish language they were called *Caisttallamh*; in Icelandic, *Jardus*;—meaning in both tongues earth houses. Behold the epitome of architectural history,—from Cave to Castle, from Excavation to *Building*. C.E.

BRISTOL OFFICES OF THE LIVERPOOL, LONDON, AND GLOBE INSURANCE COMPANY.

THE elaborately-ornamented building of which we publish a view in our present issue has been erected in Corn-street, Bristol, as the West of England and South Wales district offices of the insurance company named above. Mr. W. Bruce Gingell was the architect. The façade presents a frontage of 55 ft., with a height from the footway to the apex of the pediment of 70 ft., and is Italian in character, freely treated. The lower story is divided into five bays or compartments, the central ones wider than those at the ends—the bays being formed by ten attached columns of the composite order, eight in couples, and the end ones single, standing on rusticated pedestals of blue Pennant stone from the Stapleton quarries; the rustics vermiculated, and the moulded surbase continued over the heads of the windows lighting the lowest rooms, supported by consoles on the jambs. The fabulous bird known as the "liver," which is the crest in the arms of Liverpool, where the company have their head offices, has been introduced in a central position among the foliage in the capitals of the columns. In each of the three central compartments is a large window, glazed with one sheet of plate glass, and in each end compartment is a doorway, one being the entrance to the company's offices, and the other to the suites of chambers that are arranged for the occupation of professional men, on the first, second, and third floors of the building. The piers between the windows, and to which the coupled columns are engaged, have moulded and vermiculated rustics, and terminate with impost caps, from which spring the arches over the openings. The archways of the two entrances are similarly finished, and each of the five openings has a sculptured head on the key-stone; that to the centre opening symbolising Time, with the hour-glass, sickle, serpent, and other emblems; those to the two other doorways being firemen, classically treated; and those to the windows being river gods, one representing the "Mersey" for Liverpool, and the other the "Thames" for London. Above the doorways are panels filled in with banded laurel-leaves, over which are swags of flowers and fruit; and then the lower order of the front is completed with an entablature, broken over the columns, the cornice having dentils and enriched mouldings; the architrave is also enriched, and the frieze over each column decorated with swags of fruit and flowers. The principal story of the façade, although one architecturally, is divided into two internally. The order used is Corinthian, the columns having their axes over those of the basement story, and mounted on pedestals having the dado of each enriched with drops and festoons of fruit and flowers, with ribands. The capitals are carved with acanthus foliage, among which is introduced the owl, as an emblem of the wisdom of prudence. The piers to which the columns are engaged are channelled and rusticated, and form jambs to the windows of the first floor, at the head of which moulded caps and carved consoles support splayed and moulded heads, forming part of a frieze running through between the columns to sever the first and second floors, and decorated with swags and drops, over which runs a cill course with enriched mouldings. The piers are continued to form the jambs of the second-floor windows, and from which spring archivolts running round the semi-circular openings, and finished with carved key-stones. A bold effect is given to the capitals of the columns by recessing the spandrels of the circular window-heads so as to admit of the upper part of the columns becoming whole above the imposts, instead of three-quarters, as below, and thus finishing with entire capitals instead of parts. The upper order terminates with an entablature broken over the columns, and with frieze and architrave omitted in the three central bays. The attic story presents five semicircular-headed window openings, each having panelled jamb pilasters, with moulded caps and bases, moulded and enriched archivolts, with carved key-stones and carved spandrels, finished above with moulded cornices. Before the piers between the windows, and upon pedestals, stand eight sculptured female figures, arranged in pairs to correspond with the coupled columns below, and representing the elements and the seasons—the four central ones being Fire, Air, Earth, and Water; and the others, Spring, Summer, Autumn, and Winter. Each figure is nearly 8 ft. high, and has suitable emblems and decorations. The responds are wrought as rusticated pilasters, with moulded caps and bases, and before each is a large sculptured vase or terminal, ranging with the single column below. The entablature is broken over each pair of figures, and is supported by them, the frieze over the figures being panelled and carved into water-leaves and flowers, and that over the centre windows carved and decorated with swags of flowers, and over the others panelled, and filled in with laurel-leaves and bands. From the entablature, over the four central figures, rises a carved pediment, the mouldings of which run into and form scrolls in the tympanum, wherein also are cornucopiæ with fruit. From the entablature extending over all the figures rises a large angular pediment, which is entirely filled in with sculptured figures, emblematical of the wisdom and duty of guarding against the suffering that may be caused through fire, or death, or old age. A figure of Minerva occupies the central position, and with outstretched arms is directing her attendants to dispense gladness and aid to the widows and orphans, the aged and unfortunate, who, by some prudential steps, have been brought under her protection. Two large and richly-carved terminals stand on pedestals at the sides of the pediment, against which are large moulded scrolls with cornucopiæ.

From the doorway to the company's offices a large lobby is entered, having a tesselated pavement, and with walls finished with Corsham stone, and decorated with a pedestal course, on which stand eight pilasters, with carved capitals. To the right is a doorway to the Board-room, for the private use of the directors, decorated with architraves, panelled jamb pilasters, and carved consoles. An entablature runs round this lobby, breaking over the pilasters, and the ceiling has coves, ribs, groins, centre flowers, and other decorative plaster work. Passing through large folding doors, a vestibule is entered, the walls of which are of Corsham stone, and the floor has a tesselated pavement. The ceiling is coved and panelled, and the light is admitted through stained glass. This vestibule leads, by large glazed doors, into the public office, wherein is carried on the general business of the company. This apartment is 56 ft. extreme length, 32 ft. extreme breadth, and 28 ft. high; the walls finished with Corsham stone, and decorated with pilasters and columns, and entablature of the Corinthian order. Four angle pillars and four detached columns are of the finest red Mansfield stone, harmonising in colour with the Corsham stone. The floors are paved with tesseræ in an ornamental pattern, and the room is lighted from above by large quadrantal and one semi-dome light, all filled in with stained glass of an azure tint, having patterns thereon in purple, orange, and white. The ceiling has diapered ribs, with flowers at the intersections, and bold coves and groins, and barrel vaults at the ends. The counter, desks, and fittings are of oak, with bronze ornaments. On one side of the room is the secretary's office, and on the other the medical examiner's room; and at the extreme end are the clerks' cloak-rooms, lavatories, &c. From the Corn-street end of the public office the board-room is entered, which is a fine and lofty room 20 ft. square, lighted by two large windows, and finished with panelled dado, and a plaster ceiling with coves. In the basement is a large repository, and a lunch-room for the company's clerks. The remainder of the basement is a large cellar with two front offices, let to wine-merchants. The lower doorway in the front is the chambers' entrance, and leads to a staircase, having flights of stone steps up to the first, second, and third floors, which are let as professional chambers. On the top of the building is a residence for the company's messenger. The whole of the structure is fire-proof, upon the system of Messrs. Fox & Barrett, the flat roofs being covered with asphalte, by Mr. Pilkington, of London. The tesselated pavements were executed by Messrs. Maw & Co. The carving and sculpture, and the modelling for the same, and for the plaster enrichments, were executed by Mr. T. Colley, of Stoke's-croft, Bristol, late of London. The warming apparatus is by Messrs. Haden & Son, of Trowbridge. The general contractors were Messrs. Jones & Sons, of Gloucester, but, they failing to complete the work, the remaining masonry, &c., was done by the company, through Mr. Tucker, the clerk of the works. Mr. Gorett executed the carpentry and joinery, and fittings; Messrs. Lewis & Sons the plastering and painting; Mr. J. Harris the smiths' work; Mr. Palmer the plumbing; Messrs. Adlam & Sons the gas-fitting; and Messrs. Hancock the furnishing. The stained and embossed glass was executed by the St. Helen's Company. The total cost, exclusive of the land and the architect's commission, was about 11,000*l*. The cost out of this of the external carving and sculpture, and the modelling for it and for the internal plaster, was 1,780*l*.

STATE CAPITOL, ALBANY, NEW YORK, U.S.

IN addition to the illustrations of the Capitol now being erected for the State of New York published in our last, we give, as promised, the plan of the first floor.*

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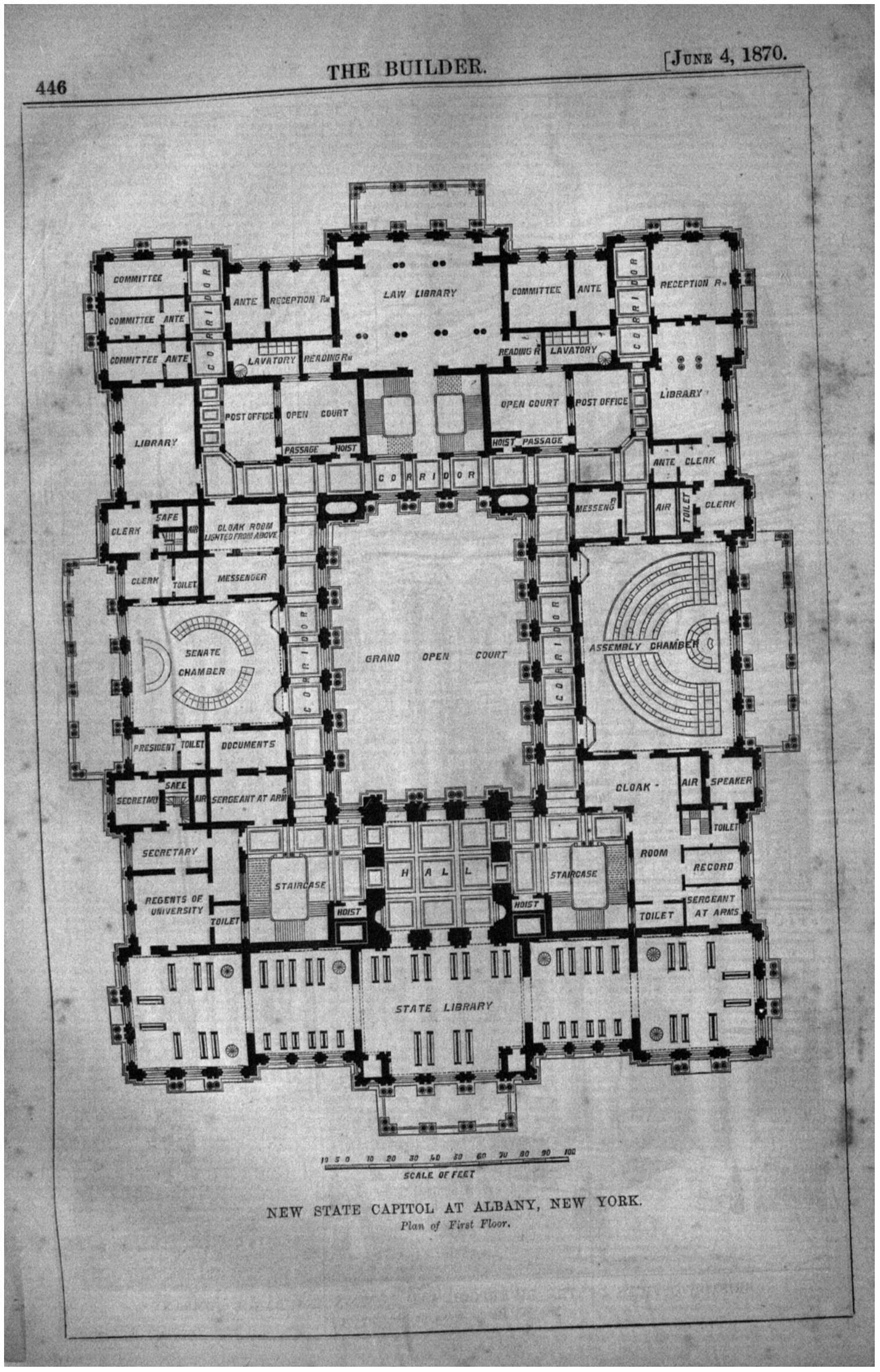
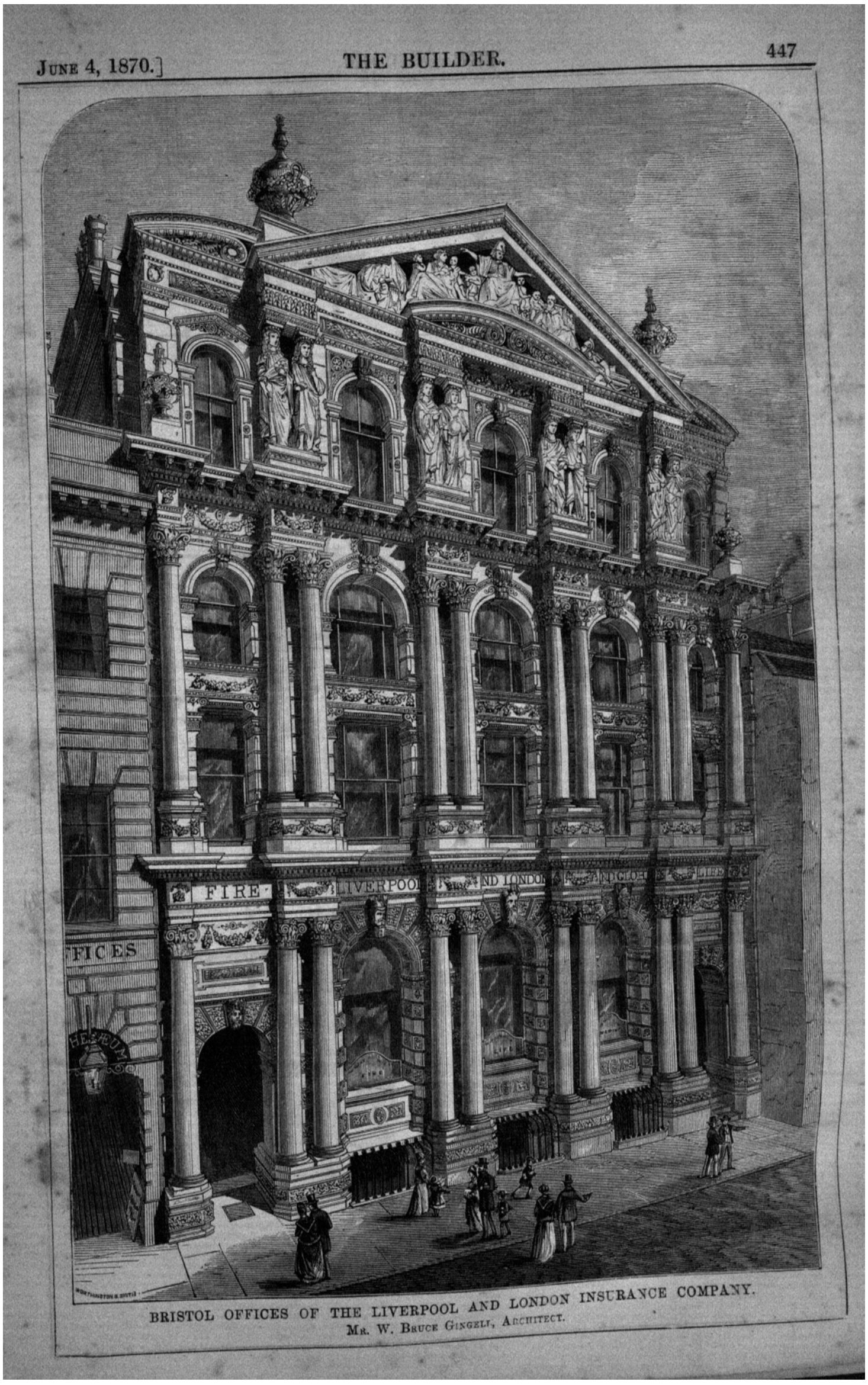
* See pp. 425, 426, and 427, *ante*.



NEW STATE CAPITOL AT ALBANY, NEW YORK.

Plan of First Floor.



BRISTOL OFFICES OF THE LIVERPOOL AND LONDON INSURANCE COMPANY.

MR. W. BRUCE GINGELL, ARCHITECT.

THE PORT OF LEITH.

A SEAPORT TOWN now-a-days is the great *pons asinorum* of the sanitary economist; and there are very few in the country, if we exclude Liverpool and Glasgow, more deserving of attention and study than the port of Leith. Not so much of itself, perhaps we should admit, as its neighbourhood; for it is impossible to arrive at any correct conclusion with regard to the death-rate of Edinburgh (to which we recently devoted some space), without at the same time taking into consideration the sanitary condition of its surroundings; and with the adjacent town and seaport of Leith, the capital of Scotland has from time immemorial been associated. Leith, in fact, has not only excellent materials within itself for observation; but it is, and has always been, the seaport of a capital city, and during several centuries it was also the principal port of an independent kingdom.

Leith, we find, is one of the eight principal towns of Scotland which every quarter supplies, *pari passu* with Greenock, the highest death-rates in the Registrar-General's reports. It has certainly possessed for many years the highest returns of mortality in that which is now termed the *zymotic*, or, in plainer language, the contagious and epidemic class of diseases; and in this abnormal feature of its "causes of death" it ranks higher than Dundee or Greenock, much higher than Aberdeen, and nearly twice as high as the city of Perth. We find from the last published and most recent *detailed* annual report of the Registrar-General for Scotland, which relates to the year 1867, the following trustworthy particulars:—Of the eight principal towns, the mortality from the zymotic class of diseases was heaviest in Leith, and lightest in Perth and Aberdeen. Thus, in every 10,000 persons in each town, 25·6 died from the zymotic diseases during the year in Perth, 36·7 in Aberdeen, 57·6 in Edinburgh, 58·7 in Greenock, 63·1 in Glasgow, 63·4 in Dundee, 67·3 in Paisley, and 70·3 in Leith. If we compare the proportion of zymotic deaths to the total deaths, the towns arrange themselves in nearly the same order—Perth and Aberdeen with the smallest proportional mortality, and Leith the highest. Thus in Perth, 12·16 per cent. of the deaths were caused by the zymotic class of diseases; in Aberdeen, 15·14 per cent.; in Greenock, 19·63; in Edinburgh, 21·21; in Dundee, 21·27; in Glasgow, 22·93; in Paisley, 23·92; and in Leith, 25·38 per cent. This fact of itself is strongly suggestive of there being something wrong with its sanitary condition.

A very few words regarding the history of Leith will make our subsequent remarks more intelligible. For several centuries it was, as we have said, the only, or at least the principal, seaport town in Scotland. Its site and its name had, of course, been determined by the little river on whose banks it is situated, and divides it into two parishes, North Leith and South Leith, and which of late years has acquired such an unenviable notoriety from its extremely filthy and polluted condition. Logan of Restabrig, a fierce baron of the feudal period, held the original grant of lands, and also of the mills of Leith, under a charter of Robert the Bruce.

Leith was up to this period a strongly-fortified town (a portion of its citadel walls still exists), and from this reason it occurs that the great—the only grand incident of its history—is the celebrated siege which it sustained against the English army at that eventful period, when Elizabeth thought it necessary to the stability of her throne to reduce the power of the Guises. It was defended, as all readers of the history of Scotland know, by Mary of Guise, with the aid of French troops; but, referring our readers to Mr. Hill Burton, or, better still, to Mr. Anthony Froude, for a minute account of this celebrated siege, we may venture to transcribe a little story from the last historian, which illustrates more pointedly than many pages of political disquisition can do the manners and customs of the contemporary warfare. There was, it will be remembered, a conference arranged between the leaders of the armies for a capitulation or an evacuation—we forget which—and two sets of commissioners were appointed. The conference opened on the 17th (between the French and English commissioners) an armistice was allowed for a week, and the armies had leisure to exchange courtesies. The French and English officers met at a sort of pic-nic on Leith sands, each bringing with him such victuals as he had in store. From Grey's camp came hams, capons, chickens, wine, and beer. The French produced a solitary fowl, a piece of baked horse, and six delicately-roasted rats. The last, they said, was the best fresh meat in the town; but of that they had abundance.*

After the accession of James to the throne of England, Leith lost its position as a fortified town; and again after the union of England and Scotland it also seems to have lost much of its importance as a seaport. In other respects it seems to have retrograded; for it was always more or less borne down and held in subjection by the city of Edinburgh, which had, by purchase, we suppose, at an early period, succeeded to the feudal superiority and inheritance of Logan. Although most of these rights have been acquired or abrogated, it is curious that Leith up to this very hour pays a sum of 2,000*l.* to the Edinburgh Presbyterian clergymen, in commutation of an ancient claim of one mark per ton, security for which is still provided for by a lien over its dock and harbour dues.

Those who wish to obtain a bird's-eye view of the port of Leith should ascend the Calton-hill of Edinburgh, take their stand under the shadow of that group of massive pillars, with their broken entablature, which seem designed to reproduce the ruins of the Parthenon, and turn their eyes to the north. Such a scene one seldom sees and never forgets. Edinburgh, we discover, is connected by an unbroken series of regularly planned although unfinished streets and buildings with the town of Leith; and the distance from centre to centre,—say from the Post-office in Waterloo-place to the upper drawbridge over the harbour,—may amount, as the crow flies, to something like two miles. Between the foreground and the sea a number of nurseries and market-gardens give the scene something of a rural and suburban aspect, which is greatly enhanced by the Links of Leith and the verdant meadows of Craigentinny. To the right hand lies the fashionable watering-place of Portobello, famous for its marine parade and also its potteries; to the left the fishing village of Newhaven, celebrated for its stalwart and industrious fisher-women.† The view is bounded on the one hand by the fertile champagne country of East Lothian, and promontory of North Berwick Law; on the other by the picturesque coast of Fife, and the sloping eminences of the Ochil hills; while the whole expanse of the middle distance is filled with the "dark blue waters" of the Firth of Forth, with its pretty green islands glistening on its azure bosom. We need not put in the ships at anchor, the white sails, the smoke of the steamers, the forest of masts in the docks, or the steeple of the parish church. This last feature of the picture unfortunately does not exist. We are more concerned with a multitude of tall chimneys, gigantic glass cones, and sugar-house and coke work furnaces, and boiler works, all of which are more or less the means of actively discharging foreign particles of matter into the surrounding atmosphere. It is a pity to find such a pleasing landscape and seapiece destroyed by accidental effects like these, which at first glance we are sure must be capable of remedy.

We shall now proceed down Leith-walk, which is the great artery of communication between the city and the seaport. The walk from Princes-street, in Edinburgh, to the Kirkgate, in Leith, *vid* this thoroughfare, is something like going from Regent-circus to Bagnigge Wells-road. South Leith kirk, which we pass on our right hand,—a rather successful restoration of the Mediæval Gothic fabric, by Mr. Hamilton (minus the spire, however), stands in the centre of a small and highly over-crowded graveyard. Surrounded as this churchyard is by a dense population, piled up in the tall tenements, with the inevitable common stairs, it must be highly injurious to health, and we have no hesitation in saying that it ought to be shut up without delay.

As to the rest of the public buildings in Leith, we may briefly dispose of them. The townhall, which contains the council chambers and the police court, is situated at the intersection of Constitution-street and Charlotte-street, and is rather a favourable specimen of municipal architecture in Scotland, of the Græco-Italian style, so fashionable in Edinburgh fifty years ago. If, however, the expense which has been lavished on the Ionic pillars that are attached to its northern elevation had been devoted to the enlargement and improvement of its staircase, there would have been an obvious gain to the community. The assembly-rooms, of which we have only an elevation of pilasters and pediment, are now converted into merchants' offices. The corn exchange is rather a tasteful building, by Mr. Cousin, a sort of composite French and Italian design, with an octagon dome. The custom-house in North Leith, which is the best building in the port, is a solid and substantial reproduction, on a smaller scale, of its prototype in Lower Thames-street. The Presbyterian churches are either above or beneath notice; and the Early English Episcopal chapel, by Mr. Gilbert Scott, has been previously noticed in our columns. The great buildings in Leith are the docks, the most recent of which, the Victoria Dock, is in every way creditable to the engineers, the contractors, and the community.

The Tolbooth-wynd, in which is situated the jail of the borough, turns off at right angles from the Kirkgate towards the harbour; and is a curious irregular street, opening obliquely, and sloping downward at the same time towards the fish-quay. It contains several narrow dingy alleys, communicating with St. Andrew-street; but the nuisance here that principally attracted our attention was the smell of putrid fish proceeding from the costermongers' stalls on the quay, and from the *débris* and entrails profusely scattered around them.

Turning to the left, we looked into the interior of an ancient tenemented dwelling, which is divided into single rooms. Our visit was during the day, and most of the male inhabitants were abroad. But, judging from the number of women and children, squalid and dirty, we could not but suppose that overcrowding the poorer population had reached its climax in this part of the port. The mass of disease and filth must be very great, which is concentrated in such unmistakable plague-spots. Water-closets there were none; in fact, there was no water nor soil-pipe—no water supply at all but that which was derived from the scanty and uncertain source of the public wells. Similar instances we rapidly glanced at in the adjoining streets of the Peat-head and the Cable-wynd. Certainly, these were some of the worst examples of overcrowding we saw.

We now retraced our steps, and came eastward along the "shore," as it is called, or rather that ancient line of houses which overlooks the harbour, some of them dating, we believe, from the sixteenth century. We did not go up-stairs on this occasion: we went *down*, among the cellar dwellings with which the whole street is lined. It is hardly necessary to say that they were thickly populated. Ostensibly occupied during the day as public-houses and subterranean cook-shops, they were, it cannot be doubted, during the night devoted to worse purposes. The sound of a hurdy-gurdy, and a German girl's voice also grinding at the everlasting song of "Sleswig Holstein," reminded us that the foreign sailor was here trying to find his hours of relaxation ashore, and led us to think with astonishment at his appetite for such enjoyment. It is gratifying to report that the sanitary inspector of the burgh is looking sharply after these hovels.

Passing on our way to Quality-street through one of these narrow, dingy closes, into which the light of the sun can never penetrate, we were forcibly and even dangerously reminded that we were at that moment in a country in which the lower class of citizens think it no disgrace to project the contents of their pails on the public roadway. Why must this horrible practice continue to exist in Scotland? Since the poor people will persist in doing such frightful things in spite of Police Acts and Summary Procedure Bills, in spite of fines or even of imprisonment, could some sanitary engineer not invent a cheap form of a cast-iron trough, or "Jawbox," as they say in Glasgow, copiously supplied with water, into which they might legally and honestly discharge their pails? To be sure the surface manure would in such a case be lost to the dung contractor, but that is surely not a paramount consideration.

Quality-street, which we have incidentally mentioned, was at one period the fashionable *quartier* of the town, when the Leith Races, as the poet Ferguson describes them, flourished in all their glory. It is now composed chiefly of warehouses and corn-lofts; and we were speedily

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* Randolph to Killigrew, June 22, 1560. MS. Rolls House. *Vide* Froude's "History of England" (Reign of Elizabeth), vol. i., p. 254.]

† Leith, Newhaven, Portobello, and the adjacent fishing village of Musselburgh, of which it was long ago said:—

"Musselburgh was a burgh
When Edinburgh was nane;
Musselburgh will be a burgh
When Edinburgh is gane!—"

these four places constitute, in Parliamentary parlance, "the Leith District of Burghs."

made conscious of the powerful effluvium of guano proceeding from one of them,—a commodity, we believe, which constitutes a staple trade of the port. Immense quantities of guano, which it is hardly necessary to explain is the decayed excrement of sea fowls, are constantly being concentrated in Leith, *i.e.*, imported and exported; and although some people profess to say that its gases are innoxious, we are not able to share in the opinion. The buildings in Leith, we may observe, are largely composed of warehouses and lofts, chiefly constructed for purposes of storage during the *régime* of the corn laws; but no general provision seems to be made for their ventilation.

Before leaving the harbour we must say a word or two about the drainage of the Water of Leith. As far as our observation goes, and our inquiries support us, it has not turned out altogether successful as regards Leith. Some of our readers may remember how the public indignation was excited in Edinburgh about the state of this pretty but polluted stream. An Act of Parliament was procured and a heavy assessment levied (70,000*l.*) for the purpose of its purification. An improvement commission was appointed, as the fashion is in Scotland, with a staff of paid officials to superintend the job. Without inquiry,—without any public report at least,—and without a public competition, Messrs. Stevenson were employed to lay down a cast-iron pipe in the bed of the river, reaching from the Caledonian Distillery to the Black Rocks, a point in the channel of the estuary which is reached by the scour of the Forth. Not only is this sewage lost for ever to the adjoining meadows of Granton, but the harbour of Leith, which was the principal source of complaint, still rejoices in its filthy slimy bed, which, when the tide is out, and the sun shining, vomits forth its poisonous exhalations as bad as ever. The only good thing that can be said of this particular drainage scheme is that the distillery wash has been carried out to feed the fishes in the Firth of Forth.

But we are afraid that the whole system of sewerage in Leith is rather defective; as, indeed, we may learn from any gully-hole. Most of the main sewers, of course, are laid below the high-water level. The exit valves must therefore be defective or unsuitable; and a very pernicious practice seems to exist on the part of the large manufacturers, who appear to discharge without the slightest regard to consequences, their waste steam into the sewers. There is no provision for ventilation that we could hear of.

The water supply is also sadly deficient. Leith and Portobello are at this moment supplied from the same sources as Edinburgh, and are parties to the recent Act of Parliament which denudes the Joint Stock Company and vests the property in the corporations. This, we have already said, is a step in the right direction, if properly carried into effect. The shipping in the docks are very well supplied, of course; but the poorer districts, as we have seen, are very ill supplied indeed; and it is precisely in these quarters where contagious diseases are constantly present in one form or another. Leith, we may add, has a small source of independent water supply in a neighbouring loch, situated on the rising ground halfway between Leith and Restalrig (Lochend). But as this basin of water receives the natural drainage as well as the sewage of the districts of Norton and Mayfield in Edinburgh, the water is rendered unwholesome and unfit for use. It had, therefore, some years ago, to be discontinued as a supply for the public wells, and is now, we believe, restricted in its use to the purposes of the manufactories and public works.

We may add here with pleasure that Leith is the only town in Scotland in which we have discovered public water-closets: a great step in advance, the honour of which, we believe, is due to Mr. Superintendent Grant. One or two we looked at in Storrey's-alley and Burgess-close seemed to be kept in proper order and cleanliness. There are still, however, some very filthy public and private privies about the shore which should be improved.

We have now pretty well exhausted our list of grievances under which the port of Leith is at present suffering; but one still remains which is, perhaps, the greatest and most important. We have said that guano, that is, the decayed excrement of sea fowl, and, therefore, a quasi-natural manure, is a staple trade of the place. We must now add that dissolved bones, an artificial manure, is also another staple. Leith, indeed, seems to be the grand emporium of artificial manures in Scotland. Coprolites, the fossil *exuvia* of certain extinct species of mollusca, is imported in large quantities from the oolitic beds of the Rhine and the Danube, and these, we understand, constitute the profitable admixture with the genuine bones just as chicory does in the case of coffee. But, whatever it may be along the sea beach of South Leith, at Salamander-street and Tower-street are situated a range about a mile in length of chemical works. Bone-works, gas-works, manure-manufactories, and blubber-boilers, who contrive to infect the whole atmosphere with such a villanous compound of noxious gases and bad smells as baffles all ordinary language to describe. Sulphuretted hydrogen, hydro-sulphuret of ammonia, carburetted hydrogen,—the gases which proceed from decayed bones, putrid fish, boiled oil, and fried blubber,—these and a multitude of others combine to disseminate through the surrounding atmosphere an effluvium so disgusting and intolerable that it must be smelt to be understood. Had Dante lived in our day and passed through Salamander-street, he would certainly have added a chapter to his immortal work! No doubt these manufactures are profitable, and largely increase the trade of the port. But look at the sad results, the death-rate, and think of the price which the inhabitants of the port have to pay for this modern scientific manufacture. Those curious series of old glasshouse cones, six we counted, were never built or intended for such vile uses as those to which they are put at present. Where, by the way, has the once celebrated bottle trade gone to?*

We have said enough to suggest inquiry and to promote progress. The irrigated meadows of Craigentinny are not managed as they ought to be; and we need not stay to point out how easily in such a case a blessing may be converted into a curse. A great and irreparable blunder has also been committed by the authorities in allowing the different lines of railway that encircle the coast to approach the town at such a level as to block up, like so many boundary walls, the view from the houses which are situated near the beach, and so to destroy the amenities as well as to injure the value of the property. The macadamised roads in the suburbs are generally in a shocking condition; and, indeed, as a rule, the sweeping of the streets is inadequate, if we take into consideration the heavy traffic of the port. We were also informed that the lower classes more especially are notoriously intemperate in their habits, which is, however, by no means a special characteristic of the poor people of Leith. Their food, perhaps, consists too much of stale stock fish and salt herrings.

Let us add, that we are not seeking to find fault with the local government; on the contrary, it is but fair to admit that no town in in Scotland has made such large strides in so short a time in the not very agreeable process of self-purification. Numerous Acts of Parliament and Provisional Orders have been obtained, and taxes of course have been levied; many ruinous tenements have been pulled down and the streets widened; and the suburbs, including Newhaven, have been drained, paved, and lighted with gas. But with all this and more, the sad result remains,—a deplorable death-rate; and with this staring them in the teeth, no municipality whatever can be permitted to rest on their oars. The public officers, it is proper to mention, are all persons of standing and experience in their respective departments of the public service. We have thus an unusually favourable opportunity of observing the constitution and administration of a local authority in circumstances which are confessedly difficult, and of studying its operations and action in connexion with the recent sanitary legislation for Scotland, of which it may with justice be said that Leith was at once the birthplace and the cradle. It is almost unnecessary to mention the name of Provost Lindsay, the predecessor of Mr. Watt in the civic chair of Leith. The unwearied legislative diligence and skill of this gentleman in constructing Police Bills and Public Health Acts for Scotland, has not, we fear, been sufficiently well appreciated by his countrymen. A very well-chiselled marble bust in the town-hall,—a good portrait, we were told,—serves in the meanwhile, however, to commemorate his services to the burghs of Scotland, and more particularly to the port of Leith.

* Mr. Carlyle, in a very characteristic letter to the late Dr. Robertson, of Leith, speaks of these great bottle cones as the only thing he recollected of Leith after an interval of forty years.

THE LATE JOHN WOOD, PAINTER.

JOHN WOOD was born in London, on the 29th of June, 1801. His father, a man of considerable ability, was originally intended for a literary profession, but ultimately took to business. John Wood's first idea of art he probably owed to his father. At four years old he stood on a little stool by his parent's side, intensely watching the sketch his father drew, and then eagerly copied it.

His education was completed at Aspley, in Bedfordshire, where he was under the charge of an uncle, who was much attached to him. Love for art strengthened with his years. At school he sketched his schoolfellows, and at earliest dawn, while others were sleeping, rose to make outlines from the works of Raffaelle. On leaving school, his career was for some time a dreary one. His father possessed the will but lacked the means that would have paved the way for the qualification of his son's desires; much valuable time was consequently lost before he was enabled to take a step in the right direction. At length a friend (Mr. Barnes) introduced him to Mr. Henry Sass, and in his studio he made the drawing that obtained him admittance as a probationer at the Royal Academy. Three months after he obtained his student's ticket. This was in March, 1819.

As a student he worked on zealously and enthusiastically. Medals were awarded, and he obtained the notice of Sir Thomas Lawrence, under whose auspices he made his first step in life. The Gold Medal in 1825 was the crowning reward of his student's career. From this period until about ten years previous to his death he was indefatigable in his exertions, his failing health preventing him from following his occupation. His maiden effort as an exhibitor was the picture of "Adam and Eve lamenting over the dead Body of Abel," in 1823, which attracted considerable attention. This was followed by other works of great merit, and he rapidly advanced on the road to fame and independence. In 1836 he obtained the Manchester prize; in 1844, the commission to paint the Bermondsey Altar-piece, in a general competition; and, two years after, the 1,000*l.* premium for the "Baptism of our Saviour in the Jordan."

These prizes were honourable awards in the life of one who had fought his way in the world, and he never omitted returning thanks to Providence for these crowning results of his pencil. John Wood died unmarried. His house was kept by a beloved sister, who, during the lengthened period of his illness (close upon ten years) attended upon him with devoted affection. After a life rendered happy from being employed in a chosen pursuit, dignified by perseverance and kindness of heart, he passed away on the evening of the 19th of April last, in the sixty-ninth year of his age, dying in the house he had occupied for upwards of forty years. His productions are numerous and varied.

C. J. A.

CHURCH-BUILDING IN LEICESTER.

THE foundation-stones of two new churches, one dedicated to St. Paul and the other to St. Mark, were laid recently, with Freemasonic and religious ceremonial.

The Church of St. Paul will be situated on the Dane Hills, one of the most salubrious sites circumscribing the town, on which a new colony is arising.

The site, on various trials, was found to have been previously excavated of the superficial sandstone rock, which no doubt had been made available for building the Roman structures of the town, and subsequently filled up with *débris* therefrom. This has been removed to a depth varying from 8 ft. to 11 ft. (which has entailed a considerable expenditure over and above the cost of an ordinary foundation), so that the basis of this structure may be materially founded upon a rock.

The superstructure will accommodate 800 persons, free. The funds have limited the operations of the founders to the building of the tower only so far as the apex of the roof. The church is to be built of Mountsorrel granite, bounded and interlaid with Derbyshire red grit stone, covered with the Swithland grey green slating, so as to attain unity of mass in body and colour. The dimensions are subjoined:—Tower: 21 ft. square (62 ft. high for the present); additional height required for belfry and spire, 128 ft.; making the total height nearly 200 ft. Nave: 91 ft. long by 31 ft. 4 in. wide, 38 ft. 3 in. high to eaves of roof, 60 ft. high to ridge. Aisles: 83 ft. 6 in. by 17 ft., 13 ft. 10 in. high to eaves,

28 ft. high to ridge. Chancel: 43 ft. by 29 ft 2 in., 36 ft. high to eaves. Vestry: 18 ft. by 14 ft., by 12 ft. high. Heating-chamber beneath vestry, for the reception of warm-air apparatus, furnished and applied by Messrs. Haden, of Trowbridge.

Messrs. Osborne have undertaken the execution of the work, comprising all the casualties, at a sum under 5,000*l*.

The design was selected from a general local competition. That submitted by Mr. F. W. Ordish, of Queniborough, was selected, with whom is now associated Mr. J. C. Traylen, engaged in practically developing the work. Mr. McAllister, a resident of the town, has to see that the whole is carried out in accordance with the wishes of the committee.

St. Mark's Church has been designed to fit a site of very irregular form. In plan it consists of nave and chancel of equal width throughout, the latter terminating in a semicircular apse; north aisle of parallel width, with vestry at the eastern end; south aisle in three bays, each projecting beyond the other farther south, to meet the incline line of street boundary. The tower is at the eastern end of the south aisle, and between it and the chancel will be an organ-chamber. There are three western entrances open to a spacious vestibule entered from a porch with double western doorway, and the south aisle also opens to the tower. The length of the nave is 62 ft., its width 31 ft., and its height to the point of the arched ceiling, 53 ft. The chancel is of similar width, and equal height, and is 37 ft. 6 in. deep to the centre of the apse. The north aisle is 15 ft. wide, and the south aisle about 12 ft. in the western, and 26 ft. in the easternmost bay. The tower is 25 ft. square above the base, 79 ft. high from the pavement to top of the parapet, and thence to the top of the spire, 89 ft.

The walls of the church are to be built of slate stone from Mr. Herrick's quarries, lined internally with red brick and freestone from the Doulting quarries, in Somerset. The same stone is to be used for all external dressings, and for the spire throughout. The nave is to be divided from the aisles on each side by an arcade of three arches, supported by four pillars, having shafts of polished granite, from Shap, in Westmoreland, and richly carved capitals. The arches are to be of Doulting and red Mansfield stones in alternate courses. The arcade is to be surmounted by a lofty clearstory of single-light windows, enriched internally with shafts and carved capitals. The same series of windows is continued round the apse, with tracery in the lights, and with pillars of stone externally and of marble within. The nave is also lighted at the western end by a five-light window of large dimensions, and the south aisle by a lofty three-light window under each gable.

The tower is to be almost entirely plain up to the base of the bell-chamber story, but the latter is to be richly decorated, wholly open, with deeply-recessed windows of two lights each, on each of its four sides. The angle piers of this story are to be furnished with large pinnacles, surmounted by figures of the four Evangelists.

The architect is Mr. Ewan Christian, of London. The contracts for the building of both churches are in the hands of Messrs. Osborne, Brothers, stonemasons, of this town. Their foreman, Mr. W. Lindley, will carry out the plans.

Upwards of sixty masons, besides wallers and bricklayers, are engaged in the erection of the two churches.

ERECTION OF A NEW WORKHOUSE FOR PENKRIDGE.

THE Guardians of the Penkridge Union having selected a suitable site at Cannock, the new workhouse is now being erected under the direction of Mr. Edwd. Holmes, architect, of Birmingham. The general aspect of the proposed building is south. The front block has been set apart for the board offices, immediately behind which is placed the vagrants' and receiving wards. The main block of the building runs parallel with the board offices. The dining-hall and also the kitchen-offices communicate with the main building and schools by means of corridors. The general school, boys' day-room, and play-ground are on the right of the dining-hall, while the girls' are on the left. Spacious dormitories are arranged on the first floor of this building. The infirmary, comprising the sick wards, occupies the western portion of the site, and the fever wards, which are also a detached building, are placed on the north end of the site. The accommodation provided in the main building is for 47 infirm and aged males and 10 able-bodied males, making a total of 57 males; and for 39 infirm and aged females and 20 able-bodied,—total, 59 females. The dining-hall is 38 ft. by 24 ft. 6 in., and will be arranged so that each class of adults as well as children may assemble without mixing; a division up the centre will separate the males from the females. It is intended to use the dining-hall as a chapel. Schools are provided for 24 boys and 31 girls and infants. The accommodation provided for in the infirmary is as follows:—Males, sick, 9; itch, 4; fever, 4; total, 17: females, sick, 5; itch, 4; lying-in, 4; fever, 4; total, 17. The method adopted for ventilating the building is by the use of air-bricks covered on the inside with finely perforated zinc, to be inserted at distances of from 8 ft. to 10 ft. apart near the floor level, and over them near the ceiling, except where the rooms are ceiled above the wall-plates, in which case circular ventilators, 16 in. diameter, will be placed in the ceiling and covered on the under-side with perforated zinc. Louvres will also be provided in the roofs. The building will be constructed of brick with stone dressings. The estimated cost is 6,745*l*. Messrs. Parnell & Son, of Rugby, are the builders.

STAGNANT LINCOLN.

IN some respects, there is not a more delightful city out of England than Lincoln is, not to live in. It may be divided into two parts, High Lincoln and Low Lincoln, or Lindum and Lincoln. The upper portion, in which stands that glorious monument of Mediæval architecture the cathedral, is not, in another sense of the word, the highest; but the dwellers there have important advantages over their neighbours beneath, who form the majority. This is situated on a fen which has been rendered comparatively dry by numerous dykes, filled with stagnant water, in which the sewage, or rather refuse, of the whole city, of some 27,000 inhabitants, ferments, and fills the atmosphere with "a most ancient and fish-like smell." How such an abominable stench can be tolerated for even a day in this year of grace 1870 is a mystery to every one whose experience is not wholly confined to Lincoln. It may not be unhealthy for such, who appear to thrive as, it is said, a certain domestic animal, not altogether unknown to Lincolnshire farmers, does; but, to say the least, it is not refined. There is, nevertheless, a local board and an inspector of nuisances; but what substantial thing that body has yet accomplished is not recorded. How to purify the air of such a flat and swampy place is, doubtless, a difficult problem to solve; this, however, does not justify no action in the matter. It may arise from a deplorable apathy or from a miserable spirit of economy.

It is not upon this particular subject alone that no desire to progress with the age is evinced, and things are tolerated with a spirit of patient forbearance that can scarcely be paralleled by any city of equal importance in England. To show how benighted and wrapped up in administering to the wants of the inner man,* I need but say that that great organ of progress and enlightened civilisation the *Builder* is scarcely known, and there are barely five hundred dailies sold that hail from the metropolis, and these do not reach Lincoln till London is devouring its evening papers; yet the distance between the cities could be travelled with ease in three hours and a half. Situated in the centre of the finest agricultural and, at the same time, one of the wealthiest and most flourishing counties in England, containing thirty-five market towns, this is remarkable, and naturally leads to speculation as to the enlightenment of its subordinate towns. On market days almost as many carriers' carts pour in as may be seen at the Old Bailey; and the streets are so thronged with gaping bumpkins, in their "Sunday-go-to-meeting clothes," that they are quite unpassable.

The High-street is a noble street, and only wants better architecture, and a row of trees,—which would tend to purify the air,—planted, and a continual stream of clean water from the river Witham, running down the east and west channel, to make it "a thing of beauty." There appears to be almost an aversion to anything sylvan or floral; and the paucity of trees where they naturally would flourish is calculated to make a worshipper of Nature in her pristine beauty weep. So that the gastronomic organs be well supplied with work, John Bull,—*Punch's* typical J. B. abounds,—does not care what his olfactory organs and the senses which raise man above his fellow-creatures undergo. If there be any flower at all in his garden, it is sure to be a cauliflower. There is one refining haunt where Londoners are wont to regale their souls that Lincoln would do well to notice: this is Battersea Park, so recently converted from a swamp to a well-arranged semi-tropical garden. No place offers greater facilities than Lincoln for the formation of a similar delightful resort.

It is not likely that a people who entertain so small a regard for the beauties of nature have much for those of art, oil-cake being the nearest approach to anything likely to be seen at Burlington House, and a windmill the only instrument that essays the inspirations of Mendelssohn, Verdi, or Offenbach. It cannot, however, be said that the Lincolnians are less moral or straitlaced than the inhabitants of other cathedral towns; but it must be admitted by the rapidly-increasing population, and the abundance of well-fed and clad pledges of affection, that the doctrine of Malthus is not much considered. In fine, it is incumbent upon the authorities to prepare for a large population, and not to shun a progression that may touch the ratepayers' pockets directly, to save them indirectly in the shape of doctors' bills, and inability to compete with their fellows. GARGOYLE.

* For "inner," read *outward*: a common mistake.—ED.

MUSIC.

AT a concert given by Mr. Henry Lahee in the Hanover-square Rooms on Monday last his cantata, "The Building of the Ship," was performed for the first time in public, the vocalists being Miss Edith Wynne, Miss Julia Elton, Miss Emily Spiller, Mr. E. Lloyd, and Mr. Winn, with 100 selected voices of the Tonic Sol-Fa Association as chorus, under the direction of Mr. Proudman. Longfellow's fine poem,—the poem in which he urges that—

> "The heart
> Giveth grace unto every art,"

and adds—

> "It is the heart and not the brain
> That to the highest does attain,"—

is known to most of our readers; and when we say that the music is worthy of the words, they will know it is not slight praise. We have no hesitation in asserting that this cantata is a work of very high merit, and places the composer in the front rank of his profession. A song to Marlowe's well-known words from "The Passionate Shepherd,"—

> "Come, live with me and be my love,"

and a part song, "The Threaher," were other excellent specimens of Mr. Lahee's ability that were set forth on this occasion. Miss Emily Spiller is a very promising young contralto. The concert was altogether a success.

REPAIR OF ST. ANDREW'S SPIRE, WORCESTER.

THE height of the tower and spire in St. Andrew's, Worcester, is 245 ft. 6 in. Some repairs at the summit being requisite, Mr. George Frith, of Coventry, builder, who recently repaired a spire at Hereford by simple and inexpensive means, has been employed in this case also, as in others besides Hereford. Standing in Paine's meadow, he flew a kite carrying a holding string, which was so manœuvred as to be securely passed over the top stone of the spire and round the rod which supports the weather-cock. To the thin kite-line was then attached one somewhat thicker, which was drawn over and substituted, in its turn to give place to a rope something under an inch thick. To this rope was fixed a block, through which another rope of similar thickness was drawn; and, the block having been raised to the top, and the rope to which it was attached crossed tightly round the spire and securely fastened, the other hanging by the tapering sides of the spire, formed the means by which the adventurous climber reached the top. From one part of this was suspended, by means of cords passed through the four corners, a small piece of board, just large enough to form a seat; and to the rope on the other side of the block were fastened several large weights, 12 stones in all. The

space between the seat, or carriage, and the weights was just about the entire height of the spire; and, the purpose of the weights being to form a counterpoise, when the carriage was up the weights were down, and *vice versâ*. The ascent did not occupy more than a minute, being accomplished with the greatest ease. In the ascent Frith kept himself from the wall with his feet by a walk-like motion. Arrived at the top, he left his seat and stood on the top stone, upon which the crowds below burst into a loud cheer. "Steeple Jack" answered the cheer from aloft, after which he took off the weather-cock, examined, and replaced it. He then resumed his seat, and, having lowered himself sufficiently, swung himself partially round the spire to the place where a defect existed in the lightning conductor. Here he satisfied himself as to what would be necessary, and forthwith descended to *terra firma* to get it. The conductor, he discovered, had been all but severed in fixing it. A careless workman had driven a staple almost through it; and the wonder is, not that it broke, but that it held together so long. Later in the afternoon this was spliced, a copper tube being passed over to render another severance impossible, and next day portions of defective stonework were also repaired.

BUILDERS' BENEVOLENT INSTITUTION.

A GENERAL MEETING of the subscribers and friends to this charity was held on Thursday (26th ult.), at Willis's Rooms, King-street, St. James's, to elect two pensioners on the funds,—one male and one female,—from a list of twelve candidates. The chair was taken by Mr. J. M. Macey, the president.

The chairman referred to the condition of the funds, which then enabled them only to elect two pensioners, from a list of twelve candidates. He was aware that many builders and persons connected with the building trade did not subscribe to the institution, which he thought might be owing to the general depression of trade. He trusted that in future there would be increased subscriptions, so that a greater number of candidates might become recipients of the benefits of the institution.

The poll was then proceeded with, and at its close the following were declared duly elected;—Richard Burdett and Martha A. Martin.

On the motion of Mr. Simpson, seconded by Mr. Thorn, a vote of thanks was accorded to Mr. Cozens and Mr. Stirling, scrutineers.

Mr. Joseph Bird addressed the unsuccessful candidates, and urged them not to relax their efforts in obtaining as many votes as possible for the next election, when he hoped the subscriptions would have greatly increased. The candidates must at length be elected, as their votes were brought forward from time to time.

THE MUTIPLICATION OF ARCHITECTURAL STYLES.

SIR,—Your number for May 21st contains strictures on an extremely Bœotian case of architectural criticism on the part of a contemporary. May I venture to suggest, that such a state of public ignorance as permits the crude writing in question to pass muster, is in some degree due to the latitudinarianism indulged in by architects themselves in respect of styles of architecture? Half a century ago, a sort of sumptuary law virtually prevailing, hindered architects from wilfully mixing together Chinese architecture with Greek, or Gothic with Italian; and under this state of things it became possible for persons of moderately liberal education to acquire a few architectural terms, and apply them without talking nonsense. The Oracle of the drawing-room could pronounce a portico to be Ionic, in a sonorous voice, and without circumlocation. In the present day, he is afraid of being tripped up when he draws a distinction, and so omits architecture from the list of his topics.

The claim which an art has to the regard of men of general, as opposed to technical, education is, its association with history and with literature;—Greek architecture with Plato and Socrates; Roman, with the Augustan era; Gothic, with chivalry, and also with ecclesiology; Elizabethan, with Bacon and Shakspeare; red brick walls and Palladian dressings, with Pope and Addison; &c. But, if an architect says, "I care not for all these associations: my works are Victorian, and nothing else: if I use Roman or Gothic details, I think no more of their origin than Dr. Johnson thought of Queen Eleanor when he spoke of Charing-cross;"—in this case the public revenge will be taken upon the art, by consigning its details to an equivalent position with the details of modern dress: to Dux collars Siphonia overcoats, and Sydenham trousers.

"How much a year does your house cost you in taxes, and in what style of architecture is it built?" asks the friend after dinner. Answers the host, annoyed at the familiarity, "I only think once of the taxes, and that is when I pay them; and, as to style, my fellow of an architect confounded all my notions of geography and chronology with his combinations of terms;" and added "freely treated," by way of finish; "so I suppose that I and my house are altogether in the 'freely treated style.'" G. M.

MODEST!

SIR,—In *The Church Builder* I find a communication from Mr. J. H. Parker, Hon. M.A., on the subject of "Cement Construction," wherein he says:—"I gave a lecture on this subject to the Royal Institute of British Architects some years since, and I am told, that since that time concrete walls and Portland cement (which is the same thing as the old Roman cement [nonsense] or Roman mortar) has come into much more general use. *The principle was not understood by many of the architects until I explained it to them.*" This is said of the body who had printed your own Essay on Concrete years before. A cooler piece of impertinence I have not read for some time. When the Institute made Mr. Parker an Honorary Member, was it for thus enlightening them? I shall be tempted to believe that what his Holiness the Pope said of Mr. Parker, the other day, is true.

AN OLD FELLOW.

RESTORATION OF CHESTER CATHEDRAL.

FROM the second annual report of the committee, the restoration of the cathedral appears to be progressing satisfactorily. Much time and money have necessarily been spent in underpinning the whole of the eastern part of the fabric, but this work has been completed from transept to transept, the choir and the lady chapel having thereby been rendered secure. Considerable progress has been made, especially in the lady chapel, the designs for the gable and roof of which will be carried out without delay. The restoration of the clearstory of the choir has also been carried out to completion, and the aisle of the choir will be immediately commenced. Meanwhile the south wall of the aisle is approaching completion. The central tower will be fully restored in the course of the summer, and already the decoration of its upper part is coming to view. It is hoped to bring out more fully the sound of the tower bells. This is included in Mr. Thompson's contract, which also comprises the restoration of the whole south side and west end of the nave, which are gradually advancing, together with the lower stage of the unfinished south-western tower and the south porch, which abuts upon it. There is to be a new roof to the nave, and it has been determined, while the scaffolding is in its place, to proceed with the groining of the nave and its south aisle. It has been determined to raise a special fund of 5,000*l.* for the purpose. The balance in the bank at the end of the past year was about 8,500*l.*; and though, at the end of March, the amount in hand had risen to about 11,500*l.*, the augmentation was chiefly due to the 5,000*l.*, which were received from the Ecclesiastical Commissioners.

WEDNESFIELD CHURCH, NEAR WOLVERHAMPTON.

AT Lichfield, on Saturday week, the Chancellor of the Diocese gave judgment in an application by the Rev. W. Stephens, incumbent of Wednesfield, for a faculty for the repair and alleged improvement of the church; and also for sanction for alterations and repairs he had caused to be made. He was represented by his proctor, Mr. Hodson, and opposed by Mr. Chinn, on behalf of Mr. Bradburn, churchwarden, and certain other parishioners. The opposition opposed internal alterations until the fabric itself, and especially the churchyard wall, was put into a thorough state of repair. The decision of the Chancellor was as follows:—1. That the chancel remain as it now is. 2. That the organ and choir be placed in the west gallery. 3. That the font be removed to the west end of the church. 4. That the coals be removed from the north-east porch of the said church, and that it be used henceforward for the entrance and exit of the congregation. 5. That free seats be placed down the centre aisle as before. 6. That the present stoves be removed from the centre aisle, and the church be heated by hot-air apparatus. 7. That the pulpit and reading desk be placed in the most suitable position for hearing and seeing according to the decision of a vestry meeting to be called for the purpose of deciding that question. 8. That the churchwardens be called upon to repair the churchyard wall, but that such repairs do not require the authority of a faculty. The judge condemned Hodson's parties in the sum of 30*l.* *nomine expensarum* of the contentious cost of Chinn's parties. Hodson protested of a grievance to his parties, and gave notice of appeal to the Arches Court.

CHURCH BUILDING IN THE ORKNEYS, &c.

EFFORTS are now being made to secure for this northern island district, church and school accommodation for the poor Roman Catholic population. There is neither a chapel nor a school for them. At Thurso, in Caithness, on the main land of the north of Scotland, it is the same. At Wick, through the labours, donations, and collections of the poor Irish labouring population and others, a small chapel-house with school, has recently been erected. This is said to be the first since the days of John Knox. For want of funds the church remains without furniture.

The poor immigrant Irish have, during the last half century, built nearly all the Roman Catholic chapels and schools in Scotland, by their subscriptions and collections; but the Scottish clergy, as a body, are slow to acknowledge the fact. As soon as the mission in the Orkneys is established, there is no doubt but the Norwegian Missionary Apostolic, now labouring with might and main, will have to give way to a new-fledged student from the college of Blairs, or for a native of Enzie or Banff.

AN ECHO FROM ORKNEY.

RAILWAY MATTERS.

THE extension of the Metropolitan District line from Westminster to Blackfriars was opened for passenger traffic on Monday morning. The line is, of course, in a state of complete efficiency, but much work yet requires to be done before the stations at Hungerford, the Temple, and Blackfriars will be thoroughly fitted for comfortable use. At all the Embankment stations there will be entrances from the Strand and the river esplanade. There will be train service at short intervals from early morning until near midnight.

Proposed Mansion House Station.—The Committee of the House of Lords have decided on the Bill as follows:—

"The Committee have given very anxious attention to this Bill, and have listened with all attention to the arguments adduced for and against it by the learned counsel on either side. The Committee have unanimously come to the conclusion that they will not sanction that portion of the Bill which authorises the construction of the railway from Bread-street to the Mansion House. With respect to the Metropolitan Railway Bill, the Committee will not consent to the abandonment of the Railway extension from Aldgate to Trinity-square, but they are prepared to recommend that there should be an extension of time, if it is desired, for the completion of the works."

The little line of narrow railway running between Festiniog and Tremadoc, North Wales, with its "Fairlie" engine, the "Little Wonder," are likely to earn for themselves a wide repute. The length of the line is only 13½ miles, with a gauge somewhat under 2 ft., and the miniature "Fairlie" engine, although so diminutive in size, is equal to 440 tons of load, and of running at 15 miles an hour, the diameter of the bogie-wheel being 2 ft. 4 in. Mr. Fairlie, C.E., who has introduced this cheap system of railways into England, was sent for to St. Petersburg, to explain to the Emperor all the working details of this model line, and the Emperor issued a commission, with Prince Bobrowsky as its president, to visit this country, and personally inspect and report upon the working details of this model line. The inspection took place on February 11th, in the presence of the Duke of Sutherland, and the representatives of all the Continental powers. The experiments were so

satisfactory, that four lines of narrow-gauge, 12 versts in length, have been ordered to be made in Russia, and Messrs. Sharp & Stewart, of Manchester, have received the order for the engines. Thus, a little line of Welsh railway has set an example to Europe as to the construction of cheap narrow-gauge lines, which will doubtless be followed by India and other countries, where great distances are to be travelled.

WATER GLASS FOR WALLS.

SIR,—Permit me to inquire, as one of your subscribers, in reference to water-glass as a preventive of moisture in walls. In the *Builder* of December 5th, 1857, is an article about it, apparently recommending its use, and I wish to ask whether experience has proved it to be efficient and lasting. I am building a hospital, and I desire to make the walls impervious to moisture and non-absorbent of exhalations peculiar to the atmosphere of a hospital. Our walls are usually "plastered" with a good quality of lime and sand mortar, and finished with a coating of plaster of Paris; upon this I propose to use water-glass, if it can be recommended.

CARL PFEIFFER.

New York.

SWANSEA WATERWORKS.

WITH reference to some particulars recently quoted in our pages, at the request of inhabitants of Swansea, from the *Cambrian*, we are asked to print the following from the same journal, and most willingly comply:—

"*The New Waterworks.*—In an article in reference to the leakage at the New Waterworks, in our issue of the 13th inst., we inadvertently stated that the new works were carried out under the immediate supervision of Mr. E. Cousins, the resident engineer of the borough. We very much regret that we should have fallen into such an error, but regret still more to find that the mis-statement has been copied into the *Builder* and other metropolitan papers, and comments made therefrom reflecting unfavourably upon the professional reputation of Mr. Cousins. We need not say that we had no desire to unduly reflect upon the skill and attention of our surveyor:—the only inference intended, and the only inference which we believe the public drew from the article, was that, notwithstanding the great care taken in the examination of the works (they being superintended by those in whom every confidence was justly placed), so great a leakage now exists. However, another inference has been drawn; and, as we have before stated, we regret the error which we inadvertently committed. Mr. Cousins had nothing whatever to do with the new waterworks, and consequently cannot be held in any way responsible for the leakage. Doubtless, the *Builder* and other metropolitan papers which copied our mis-statement, will as readily give insertion to this correction, and thus remove any false impression which arose therefrom as to the professional reputation of our surveyor."

WINDOW FRAMES AND THE BUILDING ACT.

SIR,—I doubt whether many of your readers will consider the defence set up by Mr. Power in vindication of the clause in the Building Act relative to sash-frames quite satisfactory.

Those who have given the question their serious attention know full well that the reasons he places on record for its retention vanish directly the following facts are stated:—That the clause in no way enforces us to rebate the jamb for the frame, and that it does not compel us to keep the frame flush with the reveal.

It is impossible to understand how the *mere* setting back 4½ in. can prevent the frame, in case of fire, from falling outwards; and it is equally impossible to understand how the provision prevents the spread of fire, while it allows the exposure of nearly any quantity of facial woodwork, provided it is in the required recess.

With Mr. Gundry, I think the clause might be modified so as to be a really potent guard against accident, and, at the same time, not to deprive fenestration of one of its greatest charms.

Shortly after the Great Fire, when houses such as those still existing in Cheyne-walk were built, window openings were treated as settings for glass; but in these days of anybody lecturing everybody on the principles of truth, they rarely rise above the level of holes in the wall. But are we not living in the age of burlesque?

JOHN F. BENTLEY.

LICENSE FEES FOR HOARDING.

THE QUEEN *v.* THE COMMISSIONERS OF SEWERS FOR THE CITY OF LONDON.

THIS was an application (Court of Queen's Bench, Westminster) on the part of Mr. Brassey, the contractor for the new buildings at the General Post-office (St. Martin's-le-Grand), in the City, for a *mandamus* to compel the Commissioners of Sewers to grant him a licence to erect a hoarding on the site of the proposed buildings, according to the conditions of the local Acts, which, he contended, they had violated, by imposing upon him conditions they had no right to require. These conditions were that the licence should be only for two months; that separate licences should be taken out for each of the new buildings; that 10*l.* should be paid for each; and that no placards or advertisements should be exhibited on the hoardings. To these conditions he objected, especially to the first, his contract being for works which would occupy two years in the execution.

Mr. Melish, Q.C., and Mr. J. Raymond, were for the applicant; Mr. J. Brown, Q.C., was for the Commissioners.

The Court, after some discussion, were of opinion that the limitation in point of time was unreasonable, and they also held that the other conditions as to the hoarding, except as to payment, were not authorised by the statute; and that, therefore, the applicant would be entitled to be allowed to put up the hoarding as he required.

CAMBERWELL CHARITY ESTATE COMPETITION.

SIR,—Will you kindly insert in your next impression the following copy of a letter which I have sent to the Camberwell Vestry, in the interest of all who have engaged in this competition?

GEO. GOUGH.

"The *Builder* of to-day contains a notice of a communication by Mr. Dawnay, stating that 'the design sent in by the local *Surveyor to the Charity* has been pronounced the best,' &c.

As one of the competitors, I have often applied at the Vestry Hall for information relative to the progress of the competition, but without effect, until the last occasion, when I was informed that the names of some of the competitors having oozed out, and the committee being therefore unable to agree, it had been determined to refer the decision on the plans to the *Vestry Surveyor*.

I understand that the terms 'Surveyor to the Charity' and 'Vestry Surveyor' are synonymous; and as it would be manifest favouritism to authorise a competitor to adjudicate upon the designs, I sincerely hope that the facts of the case have been misrepresented; and that, in justice to all who have devoted time and money to this competition, you will appoint some disinterested member of the profession to report on the plans, and leave the awards in his hands, or alternatively, that you leave the competitors to decide the matter by individually voting for a specified number of the plans submitted, and that the premiums may be awarded to the designs obtaining the greatest number of votes.

I have sent a copy of this letter to the editor of the *Builder*, requesting him to insert it in his next issue."

ARCHITECTS' ACTIONS.

SIR,—The suit brought before the Master of the Rolls in April last was with the view to determine the nature of the agreement existing between the parties,—the plaintiff affirming it to be one of partnership, the defendant denying it. The result proved the plaintiff was right.

The suit is now in a position rather unusual, as it appears from the defendant's letter, which appeared in your late number,—the decision of the Master of the Rolls satisfying both parties.

THE PLAINTIFF.

OWNERSHIP OF ARCHITECTS' DRAWINGS.

NORTHERN ARCHITECTURAL ASSOCIATION.

AT the quarterly meeting of this society the following resolution was passed:—"That the universal custom in the north of England has been for contract plans and drawings, and all other plans necessary for affording a complete knowledge of a building, to belong to the architect; and the plans to be retained by him on the completion of the work." The president stated that on the 16th of April, 1861, the association adopted a scale of professional charges, and a note was printed with the charges to the effect that the copyright of designs and drawings was in all cases the property of the architect. It was resolved that a copy of this note should be forwarded to the Institute with the resolution.

ANCIENT LIGHTS.

NEW BUILDING ACT.

IT is greatly to be desired that some few clauses should be inserted in the new Act now contemplated to define and restrict the laws of ancient lights in London. In so vast and crowded a city there ought to be special regulations which, on the one hand, would prevent men injuring, annoying, or encroaching on their neighbours by overgrown buildings, and, on the other, would allow builders to erect handsome and commodious structures without vexatious restrictions. When Sir William Tite and others bought up the India House, and constructed upon the site the present fine block of offices, an action was brought against them by the owner of a house on the opposite side of Leadenhall-street, for obstructing light and air by means of the new buildings being some dozen feet, perhaps more, loftier than the low-browed edifice they supplanted.

Now, without going into all the merits of that particular case, it appears to us unreasonable and outrageous that from the *opposite* side of a *principal* thoroughfare of London such a claim should be set up. In the first place, the new buildings are only of the average height of houses in the City; and cannot be attacked as overgrown, or out of rule. In the second place, they left much more than space enough to strike an angle of 45 degrees from the front-door steps of the houses opposite. Probably nine out of ten of the City streets are less than 30 ft. broad, and here was a street 35 ft. to 40 ft. wide. To deny handsome buildings in a main thoroughfare of that class is to deny them altogether. If we remember, an injunction was obtained to stop the building of another house or warehouse some years ago, in a good thoroughfare in or near Upper East Smithfield, upon a similar objection. Any clauses in the new Act might reasonably apply to controlling the erection of very lofty buildings, back to back, within a few feet of each other.

And a second regulation in the new Act might justly be the graduation of height of buildings in narrow lanes. These two subjects would work together. We see with pleasure that clauses are already introduced to limit the height of buildings, but think they might be improved by a little extra thought.

H. & R. POWELL.

CHURCH-BUILDING NEWS.

Llangunllo.—The old parish church has been replaced by a new edifice, which has been opened for divine service. The new church has been built from designs furnished by Mr. Middleton, of Cheltenham, who is also the architect of the church that is now being rebuilt at Cenarth. The carpenter's work was done by Mr. D. Davies, of Llwyngwern; and Mr. D. Thomas, of Penrhiwllan, did the masonry. The work throughout was superintended by Mr. J. Rees, of Lookabout, the churchwarden. The carving and coloured decorations will cost 130*l.*; and the entire cost of the building, we believe, will be about 1,800*l.* The church is built upon the site of the old fabric, and is very nearly of the same dimensions. The style is Geometrical Middle Pointed. The edifice will accommodate about 200 persons. The walls are lined with red brick and Bath-stone bands, relieved with ornamental patterns of red and white brick. The seats are open, and of pitch pine, with white deal panels.

Little Stambridge.—The restoration of the church of St. Mary in this village having been completed, it has been re-opened for public worship. The chancel, the foundation of which had given way during the extremely dry season of 1868, has been entirely rebuilt, and a three-light window inserted in the east end. The church has been refloored and fitted up with open seats. By the liberality of Mr. W. T. Allen, of Little Stambridge Hall, two new windows have been placed in the north and south sides of the nave, and we are informed that it is the purpose of the same gentleman to place a new window of stained glass in the west end wall as soon as it can be prepared.

High Ham.—The re-opening of the ancient church of High Ham, after restoration, has taken place. The work just performed has been strictly that of restoration rather than embellishment. The whole of the roof and ancient benches have been restored, and the remainder of the church reseated and refloored. The internal stonework has been cleaned and repaired, and the walls re-plastered. The architect from whose plans the work has been executed is Mr. Wood, of Bristol, and the contractor Mr. B. Gillett, of Langport.

Peterchurch (*Hereford*).—The parish church of Peterchurch has been re-opened by the Bishop of Hereford, after repairs and restoration which have cost about 1,200*l.* This church was in a very dilapidated condition, but it is an interesting example of Early Norman architecture. The walls, externally and internally, have been cleaned and pointed; new stone copings and crosses have been built over the apse and first chancel archways; and the old stone tiles replaced with Broseley tiles. In the south wall of the nave, which has been rebuilt, a new two-light window has been added to admit light, as the eleven Norman slit windows throughout the church admit but little. The Norman doorway was also replaced in the same position in this wall. The old galleries and seating have been removed, and the three chancel arches internally for the most part rebuilt. Considerable additions have been made to the stonework generally. A new pulpit placed in the south-east angle of the nave, and new gates erected in the churchyard. The nave and apse roofs are new, the others repaired. All these roofs, now opened, were ceiled and whitewashed. The seats are new throughout the church. The gangways have been paved with tiles, and the church heated. Some further restoration is contemplated to the spire and tower, and porch, when funds will permit. Mr. Thomas Edgar Williams, of London, was the architect employed; and Messrs. Lewis & Day, of Hereford, the contractors.

Clanfield.—The ancient parish church of Clanfield has been re-opened for divine service. In removing the walls, several curious relics of the ancient building were brought to light, including a small unglazed window in the outer

wall of the north transept, corresponding with another in the chancel wall, so as to enable lepers to see and hear from without portions of the service, without risk to the worshippers within the church. With the exception of the plain square tower, every portion of the church has been rebuilt, the opportunity being taken to enlarge it considerably. The chancel has been erected at the cost of about 200*l.*, borne by the lay rectors, Captain J. H. Elliott and Mr. W. Collett. The greater portion of the cost of the remainder of the work, about 1,000*l.*, had been raised before the re-opening. The architect was Mr. J. Luker, of Southend, whose designs have been carried out by Mr. E. Smith, of Highworth, and Mr. H. J. Clinch, of Charlton-on-Otmoor, the last-named having undertaken the chancel. The walls have been built of Brize-Norton stone, with freestone dressings. In the nave the wall stones have been faced and pointed; but in the chancel they are simply picked out and pointed. In all cases the old materials have been supplemented by stone of the same description. The chancel arch is nearly double the span of the old one. The north aisle has been reduced and deepened, so as to afford additional area in the nave. An old gallery which obstructed the west end has been removed, and the tower thrown open to the church, revealing the west window, which, like that of the chancel window, is of three lights. The high and close pews have given place to low open ones; and the sitting accommodation, by this means and the enlargements, nearly doubled. The entrance porch has also been made more spacious. The roofing of the interior of the church is of polished wood, with plastered panels.

Folkestone.—Christ Church has been re-opened after enlargement. The alterations comprise an extension to the westward, over which a gallery has been erected, capable of holding about 400 persons. The organ has been removed to the north chancel, and the choir seats are now placed in the chancel. The floor has been relaid with ornamental tiles, and new gas standards have replaced the old ones. The old porch on the south side has been removed to the north, and a new one erected in its place. A tower has been commenced. The building will now hold 1,150 people, a third of whom may occupy free seats. The expense of the alteration will be about 2,700*l.*, of which sum 1,600*l.* have been obtained.

Chiddingfold.—Progress has been made in the restoration and enlargement of the parish church, and a large increase of seat accommodation has been effected; but the cost of these important and necessary works will exceed 3,000*l.*; and the proposed sum of 1,000*l.*, the raising of which by the parish was made the condition on which one parishioner had generously agreed to defray all further expenses incurred, has not yet been reached. An appeal is made to the parishioners and landowners to combine their efforts to raise the sum of 200*l.*, which is necessary to make up the required 1,000*l.*

Laceby.—The church here has been restored and re-opened. The north aisle, above the foundation, is entirely new, the cost of which is defrayed by Mr. Geo. Brooks, a resident of the parish. The chancel arch is also new, and is the gift of Miss Bell. The nave and chancel, which formerly had low ceilings, have been covered with new open roofs of stained pine. The chancel, vestry, and south porch are new, the south porch being erected at the expense of Miss Brooks, the ancient arch of the porch being retained. In fact, all those relics worthy of preservation, it is said, have been preserved. A painted glass window has been placed in the north aisle, by Mr. Wm. Heaford Daubney, in memory of a member of his wife's family: the subject is Christ blessing little children. In the south wall of the nave is a painted window representing the four prophets, Jeremiah, Isaiah, Ezekiel, and Daniel, with inscription, in memory of Mr. William Brooks. There is also in the same wall, on the east side of the porch, a small Norman window, on the painted glass of which is represented St. Margaret, the patron saint of the church. This little window had been blocked up, but is restored. On the west side of the porch has been added a corresponding window representing St. John the Baptist. The old octagonal font is remodelled. The tower has been newly floored and the bells re-hung. There are three bells. The great bell has the following inscription: "*Soli Deo gloria; pax hominibus,* 1712." The second bell is dedicated to St. Mary of Hawardby, and has the inscription, "Mary of Hawardby, of us have mercy." The third bell is inscribed, "*Ista campana fit in honore sancti Augustini.*" Both of the latter are of the pre-reformation period. The church is heated with hot air. The architect employed was Mr. James Fowler, of Louth; and the contractor, Mr. Wm. Worth, of Laceby.

Whitfield.—The new parish church of Whitfield has been consecrated by the Bishop of Peterborough, amidst the rejoicings of the whole parish. On the 1st of February, 1869, during a very heavy gale of wind, the tower of the old parish church, supposed to have been built in the thirteenth century, was blown down, and Mr. Woodyer, architect, of Grafham, near Guildford, was consulted as to the state of the whole building. In consequence of his report a parish meeting was called, and the rector and the churchwardens were requested to take the necessary steps to have the old church pulled down and a new one erected. When the sum of 1,500*l.* had been collected instructions were given to Messrs. Mansfield & Booth, of Buckingham, who had sent in the lowest tender, immediately to commence the work according to designs furnished by Mr. Woodyer. The cost of the edifice, which will be about 3,000*l.*, was raised before the day of consecration. The new church is constructed in the Early English style. It consists of a nave, north aisle, chancel, organ-chamber, and vestry, and has a low pinnacled tower. It is a larger church than the old one, and is capable of seating about eighty more persons. The roof is a high-pitched, open roof, of deal, stained and varnished. The old-fashioned high pews of the old church have been replaced by open seats, also of deal, stained and varnished; and the flooring is of boards. The aisle is paved with Staffordshire tiles, and the chancel with Wheatstone's tiles. There are two porches, a grand west porch under the tower, and a south porch. The pulpit is of stained deal like the pews, and the communion-table is of oak. A brass lectern has been presented by Mr. French, one of the churchwardens. It was manufactured by Messrs. Cox & Co., of London. A temporary organ has been placed in the chamber; but as soon as funds can be obtained a new one will be erected. The warming apparatus is by Mr. Remington, of Skipton, Yorkshire. The church has a peal of five musical bells, manufactured by Taylor & Sons, of Loughborough; they weigh about 27 cwt. The whole work has been carried out under the personal superintendence of Mr. Salmon, clerk of the works.

STAINED GLASS.

Ingestre Church, near Stofford.—A stained-glass window, by Messrs. Lavers, Barraud, & Westlake, for Lady Shrewsbury, has just been placed in this church. It represents the meeting between our Lord and Nathaniel. The text is, "Behold an Israelite indeed, in whom there is no guile." The style of ornamentation and manipulation is Cinque-cento. The window is erected to the memory of the late Earl, and is placed on the south side of the chancel. The cost was 75*l.* It is an adaptation of the style and tone of colour used in the early part of the sixteenth century. The novelty of the design is the introduction of swags and borderings of pansies in lieu of those used commonly in Cinque-cento work. This was at the suggestion and desire of the present countess, as was, in fact, the general composition. Pansies were used because the youthful Lord Ingestre placed one on the coffin of his grandfather. The swags are over large. The window is especially remarkable for the effective use of white glass: this gives to the rubies, olives, &c., the richness and power of early Cinque-cento work. The window possesses points of very great merit.

Kinnoul Church, Perthshire.—Messrs. Lavers & Barraud have recently placed a large window in this church, which they have worked out in conjunction with Mr. J. E. Millais, R.A. The subjects are a series of fourteen of the Parables, which he illustrated some time since. The window is presented by Mr. Gray, of Perth (Mrs. Millais's father). It is successful, and very much out of the usual track. The window is a large Gothic one, at the west end of the church. It is 21 ft. in height and 11 ft. in breadth, and is divided into five lights. The lower portion is divided into ten compartments: over these the mullions branch off, and the upper tracery includes four other compartments, which are filled in with subjects of the same description as those below. The fourteen pictures are representations of Scripture parables. There is no overcrowding of the figures or the scenes. The scenes in the largest or centre lights in the window have, in the open squares of glass above and below, an ornamental cluster of flowers, consisting of Scriptural emblems; and the surroundings in the other compartments are also filled in with appropriate ornamental shields. The local superintendence of the work was entrusted to Mr. Smart, architect. The cost of the window will, we understand, amount to about 500*l.*

Pershore Abbey Church.—A stained-glass window, in memory of the late Captain Davies, has been inserted in one of the lancet lights of the north aisle of the Abbey Church, by Messrs. Lavers, Barraud, & Westlake, of London. The centre of the window is occupied by a small medallion portrait of St. Luke the Physician, above and beneath which are larger effective groups, the upper one "Healing the Sick," and the lower one "Giving of Alms."

Books Received.

The Dictionary of Chronology; or, Historical and Statistical Register, alphabetically arranged, and brought down to 1869. By W. H. Overall, F.S.A. London: W. Tegg, 1870.

THOUGH founded on "Tegg's Chronology," this must be regarded as an entirely new work, and much care seems to have been bestowed to make it a reliable authority for the data of all historical occurrences. It will be found specially full in statistics of the City of London, in consequence of Mr. Overall's connexion with the City as librarian to the Corporation. It is a very useful volume for the writing-table.

VARIORUM.

THE *Revue Décorative* (Asher & Co.), with 72 plates per annum, edited by Edouard Lièvre, author of "La Collection Sauvageot," is intended to contain varied examples from ancient and modern master-works, thus enabling subscribers to draw useful comparisons and opening new views and ideas to them. These examples and models will be taken chiefly from architecture, decoration, furniture, ceramic art, tapestry, and so on. The autographic process has been adopted, save in the works of the old masters, which will be given by heliography, to secure faithful reproduction of the originals. The two parts before us creditably carry out the intention. ——The novel, "Man and Wife," by Mr. Wilkie Collins, in *Cassell's Magazine*, goes on swimmingly. The thunder-cloud has broken, and the terrible difficulty up to which the principal characters have been working, long obvious to the reader, is now seen by themselves. One main purpose the author has in view is to show the evil of immoderate devotion to merely physical development.——The current number of *London Society* has a quaint chapter by the well-known New Zealander, showing how, in the year 187–, all England emigrated to Australia, taking with them their best buildings. The idea is amusing, and deserved a fuller development.——The first volume of Cassell's *Household Guide* and the fifth volume of Cassell's *Educator*, now completed, are full of useful things. The *Educator* is especially valuable.——The quarterly part of the *Family Friend* (Partridge & Co.), at 4*d.*, is a marvel of cheapness, full of interesting cuts and writing.

Miscellanea.

Harrogate Improvements. — At an adjourned monthly meeting of the local Improvement Commissioners, respecting the plans sent in for the improvement and development of the Victoria Baths estate, the Board decided that the three best plans should be selected and their authors requested to furnish fresh ones, or more definite instructions to be issued by the Board, such new designs to be the basis of awarding the premiums. The plans rejected were those by "Desdichado" (Mr. Ridley, Starbeck), and "Vincere Certo" (Mr. Hirst, Bristol); and the three to be awarded premiums were those of "Alpha" (Mr. Bown, Harrogate; and Messrs. Nelson, Leeds), "Square within a Circle" (Messrs. Dyson, Leeds and Harrogate), and "5,500" Mr. Hiscox, Harrogate).

New Street, Whitechapel.—With reference to our notice of the opening of the new street, Whitechapel, we are asked to state that Mr. J. B. Marshall, of Stratford, and Mr. William Maxwell, Plaistow, were the contractors.

Air, Water, and Health.—Dr. Playfair, in the course of his address at St. Mary's Hospital, Paddington, when distributing the prizes, said the causes of disease had lately undergone a searching examination, and the close connexion had been established between disease and putrescent matter. No epidemic could resist cleanliness and ventilation. Dr. Christian gave as a formula, "Cleanliness and ventilation will extinguish any epidemic." In the very simplicity of the formula lay its danger: it was too like the "wash and be clean" of the prophet. In 1847, from 30 to 40 deaths annually in the 1,000 of a civic population was held not extravagant. Now the average had been reduced to 25 in the 1,000, and hygienists believed in a reduction to 12 in the 1,000. If they could make the dwellings of working men as healthy as the felon's cell, they would add from eight to ten years to the life of the former. It was a terrible reflection that 17,000 school-children died annually from foul air and filth. In what field was it necessary to labour to remedy these evils? Hippocrates spoke of air, water, and soil, and these were what they had in their day to work upon. They must prevent people from cherishing their filth in cesspools, or allowing it to run into rivers, to poison the dwellers on the banks. In concluding his address, Dr. Playfair said it was a great mission prescribed to sanitary reformers to stand between the living and the dead, and bid the pestilence to cease.

Congleton Public Park.—The joint committee of the town council and the inhabitants, for the establishment of a public park and playground, have made an appeal for subscriptions in aid of the object. Mr. Kemp, the manager of the Birkenhead Park, proposes to lay out the town wood in walks, and to form the whole of the land between it and the river Dane into recreation and ornamental ground. The chief part of the land is already the property of the borough; and Sir Charles Watkin Shakerley, bart., has kindly offered to place the remaining piece, which is his property, at the disposal of the town council for the purpose of the park, on very favourable terms, on condition that the whole cost of the scheme be defrayed by voluntary subscriptions. To place upwards of 20 acres of land, commanding fine views of the surrounding scenery, at the service of the inhabitants of the borough for the purposes of health, recreation, and improvement, will require the outlay of 3,000*l*. Subscriptions have already been promised, including 100*l*. from Mr. R. Wilbraham, the high steward; and 50*l*. each from Messrs. R. Beales (mayor), J. Statham, J. Dakin, F. W. Warrington, M.D., D. Bradwell, and J. Wilson.

The Fatal Well Accident at Barking.—At the inquiry as to the deaths in this accident, and after the evidence had been led, the coroner stated that he had seen Mr. Russ, a competent engineer, on the subject, and he was satisfied that where there was no previous intimation of foul air being in the well, it was quite impossible to guard against such an occurrence as had taken place. There being no further evidence to offer, the jury returned a verdict that the deceased men were accidentally suffocated by carbonic acid gas while descending a well-hole at the Chartered Gas Company's Works at Becton. One would think Mr. Russ might at least have added that the insensibility of one of the men might have rendered it quite possible to guard against the occurrence of any more deaths, even although we were to admit, which we do not do, that the simple test of a lighted candle was not to be expected to be used in such a case before the descent of the first man. No such "previous intimation of foul air being in the well" was sought for: how, then, was it likely to be *found* or *guarded against?* It can only be found by precautionary search for it.

A Library for Swansea or Caernarvon.—The late Rev. Rowland Williams, D.D., according to the *Cambrian*, has bequeathed his library, under certain conditions, to the first Welsh town which shall provide a suitable repository for it; giving Swansea the first offer, and Caernarvon the next. He has also bequeathed the residue of his personal estate in the same way as a library fund. The rev. gentleman was Vice-Principal and Professor of Hebrew in St. David's College, Lampeter. The library, says our authority, is to be open to all creeds, colours, and nativities. The Swansea Town Council has accepted the bequest, and will, of course, provide a suitable building.

Preservation of Blackheath.—A public meeting has been held at Lewisham for the consideration of the draft scheme of the Metropolitan Board of Works for the preservation of Blackheath as an open space for health and recreation. After a discussion of two hours, the meeting expressed its disapproval of the heath being planted or enclosed, considering that the great charm of the heath was that the people could scamper over it, and do as they liked, without the restraints attached to ornamental grounds. A committee was appointed to attend the meetings of the Inclosure Commissioners. At an open-air meeting held on Blackheath, convened by the Advanced Liberal Association of Greenwich, to protest against the proposed scheme now before the Inclosure Commissioners, for placing Blackheath under the jurisdiction of the Metropolitan Board of Works (2,000 persons being present), a letter of apology for non-attendance on the part of Mr. Gladstone was read, in which it is said:—

"I have to assure you that Mr. Gladstone cordially subscribes to the necessity of preserving open spaces for the exercise and recreation of the inhabitants, and I am directed to call your attention to the Bill which has been introduced into the House of Commons by the Under-Secretary of State for the Home Department, with the sanction of the Government, relative to the preservation of commons and waste lands. Mr. Gladstone is confident that any application to Mr. Knatchbull-Hugessen respecting the particular case of Blackheath will receive immediate attention with a view to inquiry as to how far the provisions of the above-mentioned Bill might be made applicable to that locality."

Mausoleum at Headfort Demesne, Kells, Ireland.—The *Belfast Newsletter* states that the consecration of this structure, erected by the Marquis of Headfort, has taken place. The architect was Mr. J. F. Fuller. The mausoleum was erected by Mr. H. Sharpe, of Kells. The building is in the Gothic style of the early part of the fourteenth century. The plan is octagonal; the centre portion, which is supported by eight arches, on moulded columns, rises to a height of about 100 ft., terminating with a cross. The total width at the base is about 42 ft. The gable over the entrance doorway is filled with Gothic tracery, containing in the centre compartment the arms of the marquis, surmounted by the coronet and crest. The entrance archway is moulded, and the jambs have double marble columns. The floor is laid with encaustic tiles, and the tower is ornamented with bands of red and black stone.

Coloured Decorations, Gloucester Cathedral.—Last autumn some of the leading firms of decorators were asked to submit designs for the adornment of the choir vaulting, and the Chapter, a few weeks ago, accepted the design of Messrs. Clayton & Bell. Already the decoration of about one-third of the choir from the east window has been effected, and the remainder will probably have been completed in about two months. The bosses are gilded, the angel figures are partly gilded, and colour has been applied to the tracery; the panels are left untouched. Messrs. Grylls & Burlison are painting the vaulting of the chapel east of that of St. Andrew,—a chapel which is to be restored in memory of the late Sir C. W. Codrington.

The Detroit River Tunnel.—A tunnel is about to be cut beneath the Detroit river, for railway conveyance between the Michigan Central Railway and the Great Western of Canada, to do away with ferry-boats. The tunnel company has been organised among the proprietors of these railways, and the Canada Parliament has passed an Act for the work. Mr. E. S. Chesbrough, city engineer of Chicago, has prepared the plans and estimates. The substratum is stiff blue clay. The length of the two parallel tunnels to be made from the Detroit to the Canada portal will be each 8,568 ft. They will be cylindrical, and 50 ft. apart; interior diameter of each, 18 ft. 6 in. The shell will be of brick masonry, 2 ft. thick. The grade on each side of the river will be 1 in 50, with 1,000 ft. level below the river. The estimates for the entire cost of tunnels and approaches, with steel rails, &c., amount to 2,650,000 dollars.

A New Rock Driller.—The Burleigh Rock Drilling Machine, used at the Hoosac tunnel and elsewhere, in America, has been shown at work, in Deptford. A certificate, signed, F. S. S. Darby, and W. Conisbee, engineer, Atlas Works, S.E., states that it drills a hole 3 ft. deep by 2¼ in. in diameter, in a block of the hardest Cornish granite, in four minutes. It is worked either by steam or by compressed air, in which latter case it aids ventilation in boring tunnels.

Monumental.—A meeting of the Senate of Cambridge University has discussed the question of a site for the statue of the late Prince Consort, who for some time filled the office of Chancellor of the University. They [recommend that either the Senate-house or the Fitzwilliam Museum should be adopted as the site. After paying for the statue, there will remain a surplus of 1,000*l*., which it was suggested should form the nucleus of a subscription for a corresponding statue of her Majesty the Queen, to be placed in the central hall of the Fitzwilliam Museum. The Vice-Chancellor reports the deliberations to the council.——It is proposed to erect a statue of Sir Titus Salt, the proprietor of Saltaire, who is not only a successful "merchant prince," but an excellent friend to his workpeople and their children. No contribution is to exceed 5*l*.

Australian Timber.—The Jarrah timber of Western Australia, also called Mahogany, is about to be cut on a large scale, by a new company, to be called the Western Australian Timber Company, who have obtained, from the Colonial Government, exclusive right to the timber on 320 square miles of the best district for it, on condition that they construct works of a certain character, in a secure bay, called Geographe Bay, favourable to shipping, with sawmills, railways, jetties, &c. The Jarrah timber has been often spoken of, we recollect, as a very valuable sort for sleepers, posts, piles, shipbuilding, dock gates, and other purposes. Another kind, called Toorat, will also be available. Messrs. Ditchburn & Co., of Ballarat, inform us that the works will be ready within eight months from March last.

The Proposed Greek Church in Wolverhampton.—The conversion of the late little Primitive Methodist chapel in the Waterloo-road, for the purposes of a Russo-Greek church, proceeds very slowly. Three crosses on the gables of the building, and the closing of old doors and the opening of a new one, are the external signs of progress; while inside, the raising and railing off a portion of the floor by the east of the four walls, are the internal signs. As the number of those in Wolverhampton who are likely to worship within the building in the Russo-Greek style is extremely limited, the projector, Mr. Hatherby, is dependent upon foreign aid for assistance, which has not been wanting, however, at the hands of two or three Russian travellers who have looked in upon him.

Road Steamer and Patent Omnibus.—The Lord Provost of Edinburgh and a party have been trying the working capabilities of Thomson's road steamer, with a new omnibus attached for the conveyance of 65 passengers—44 outside and 21 inside;—rather large, we fear, even for a London *street* omnibus, to be economical. This road steamer, it may be remembered, has wheels covered with india-rubber tiring. It is now in use (apart from the omnibus) in various parts of this and other countries. A Versailles omnibus, too, for 50 passengers, is drawn by one of Thomson's road steamers. The rate of speed in Leith Walk was about six miles an hour, and the conveyance was exceedingly manageable, as in turning corners, stopping on a steep incline, &c. The street horses generally paid little attention to it.

Improvements in Roadmaking.—Experiments are to be tried in one of the suburban parishes of London with a steam road-rammer, which, if the promises held out by the patentees, Messrs. Gore & Green, be fulfilled, is calculated to effect a revolution in roadmaking, and entirely supersede the steam roller as yet but slightly in use. The advantages claimed for the invention are, that it combines a traction-engine and rammer: hence it can be readily and easily moved from place to place. The machine is said to be equally applicable to roads paved with granite cubes and macadam. The blow from the hammer can be regulated. The machine is said to be so simple that any one of ordinary intelligence can work it.

Hancock's Door and Picture-frame Protector.—This is a simple little sixpenny affair, but well deserves to be known. The object is to protect picture-frames, skirtings, and so on, from the effect of a door opening against them. A little half-sphere of wood, with convenience for screwing it on where needed, receives in a hole over the screw-head a little buffer of india-rubber. There are many situations in which this will be found very useful.

A Halfpenny Card Postage.—The Marquis of Hartington has stated in the Commons that the Government had decided, in connexion with a reduction of postage on newspapers and printed matter, to adopt a halfpenny card postage. That was to say, cards would be issued bearing a halfpenny stamp, on one side of which the address would be written, and on the other any communication, whether in writing or print. He thought this would be a great accommodation to the public, and extremely convenient to the Post-office, and would not materially interfere with the revenue.

Interesting Discovery at Oldcoates.—As one of the men in the employ of Mr. Athron, builder, of Doncaster (who is the contractor for the erection of the new Roman Catholic Church, built on the site of the Manor-yard), was digging a hole in connexion with the works, he came to a Roman tesselated pavement, in a capital state of preservation. The stones, which are placed in cement, are ½in. square, some of limestone and others of red sandstone. They are placed together with great skill, in diamonds and circles. A number of Roman tiles were also found.

Value of Land at Trowbridge.—At a sale of property at Trowbridge, by Mr. Graham Foley, two pasture fields, containing 10 a. 0 r. 2 p., were knocked down after a spirited competition between Mr. W. Willis and Mr. W. Gouldsmith, to the former gentleman for 4,450*l.*, or nearly 350*l.* per acre. Another field, of 3 a. 3 r. 28 p., was purchased by Messrs. Rodway & Mann, solicitors, for 900*l.* Another field adjoining, containing 3 a. 0 r. 10 p., fetched 700*l.*, Major Clark being the purchaser. A field of 6 a. 3 r. 8 p. was knocked down to Mr. J. Usher for 1,000*l.*

Fall of Watford Church.—On the 20th ult. some of the workmen employed in the restoration of Watford Church found that a considerable portion of the south aisle was giving way. They immediately removed to a safe distance from the dangerous part, and soon afterwards the wall, roof, windows, and doorway of the western part of the south aisle fell in with a loud crash, smashing the pews, and destroying a marble tablet to the memory of a son of Mr. Robert Clutterbuck.

Sculpture.—A statue of St. Joseph holding Jesus in his arms has been erected in St. Wilford's pro-cathedral in York. The statue is 6 ft. high, and stands upon a lofty pedestal of light design. It occupies the opening between the choir and the chapel of "Our Lady." The design was by Mr. George Goldie, the architect of the church, and the work was executed by Mr. R. L. Boulton, of Cheltenham.

New Infirmary, Durham.—The guardians of the Durham Poor-law Union have recently determined to erect an infirmary and detached fever wards at the north-west end of the existing workhouse. The tender of Mr. John Forster, jun., Durham, to execute the works for the sum of 3,989*l.* 17*s.* 6*d.*, the lowest received, has been accepted by the Board. Mr. W. Crozier is the architect.

The Southampton Sewage.—It is stated that the authorities of Southampton have finally determined on the adoption of the A B C process of utilising sewage, and preserving the local waters from pollution. The necessary works will be commenced at once. Leeds, Halifax, Bolton, and several other towns have decided on the same course. The works at Hastings and Leamington have been in operation for some time.

The Institution of Civil Engineers.—On Tuesday evening, Mr. C. B. Vignoles, F.R.S., president of the Institution of Civil Engineers, entertained a numerous company of gentlemen at a *conversazione* at the house of the Institution in Great George-street. The library contained a collection of fine pictures, brought together for the occasion; and in the meeting-room were displayed a large number of models, instruments, or objects of remarkable interest.

Self-acting Velocipede.—Our idea of a self-acting velocipede, we observe, is still occupying the attention of the ingenious. We do not much like the use of steam as a propelling power, however. In the West of England one so propelled has been running at the so-far promising rate of six to eight miles an hour. It requires two persons to manage it, one to attend to the miniature engine and another to steer.

Demolition of a Martello Tower at Rye. An experiment with gun cotton was made at Rye upon the martello tower No. 36. This tower, the walls of which were 12 ft. thick at the base, was entirely and safely demolished by 200 lb. of gun-cotton, divided into three charges and fired simultaneously by electricity. The gun-cotton was in 5-in. discs; and none of the *débris*, not even in single bricks, was blown away to the extent of fifty yards from the building.

Hanley School of Art and Science.—In appointing a successor to the late head-master of this school, the committee have kept in view the great desirability of providing efficient means of instruction for the promotion of scientific as well as the more important art studies hitherto carried on. This requirement being fully appreciated, the opportunity recently presented has led to the appointment of Mr. Alfred A. Bradbury, of London, and a proposed organisation of several new classes.

The Tenders for New Cottages at Thorncliffe.—The Sheffield *Independent*, in giving these tenders, remarks, in reference to the highest (5,420*l.*) and lowest (2,421*l.*), "It will be seen that the *difference* between the highest and the lowest tender was actually more than the amount for which the work was let, the highest being nearly 3,000*l.* in excess of the lowest tender!"

Erith.—A mission chapel is in course of erection on a site adjoining the National Schools. Mr. Willis is the contractor in conjunction with Mr. Watts, who has undertaken to perform the brickwork. The foundation has already been laid. The building will be 66 ft. long and 24 ft. wide. Mr. Abel Saunders, of London, is the architect.

District Surveyorship, St. Margaret's, Westminster.—On Friday, the 27th ult., this office was filled by the election of Mr. Drury, of the firm of Drury & Lovejoy. The Metropolitan Board of Works on this occasion did grave injustice to an individual, to which we may consider it our duty hereafter to refer more formally.

Competition: Industrial Schools, Eccles, near Manchester.—After the committee had examined the designs, the Government inspector was consulted, and pronounced in favour of No. 8. On breaking the sealed envelops, the author of No. 8 was found to be Mr. Edmund Kirby, of Liverpool, architect, who will be entrusted with the carrying out of the works.

Kidderminster Water-Works.—The local board of Kidderminster have decided to proceed at once with the construction of water-works. The matter has been long under consideration, but has been delayed through the opposition of a certain section of the ratepayers. Mr. J. F. Fairbank, C.E., of London, is the engineer.

Dublin Crystal Palace.—Sir Arthur Guinness, bart., and his brother, Mr. Cecil Guinness, have purchased the Dublin Exhibition Palace for 53,000*l.*, and intend to spend 10,000*l.* more in completing the building, to preserve it to the citizens as a place of amusement.

New Church in Westminster.—A church is about to be erected for a new district, which is to be formed out of the parish of St. James, Piccadilly. A site has been secured in Great Marlborough-street, and the church will be dedicated to St. John the Evangelist.

Architectural Association.—On the 20th ult., a paper on "Monumental Sculpture," by Mr. T. H. Watson, was read; Mr. Ridge in the chair. The paper dwelt on the difficulty imposed on modern sculptors by modern costume.

A Costly Chapel.—It is stated that the cost of the new Roman Catholic chapel which the Duke of Norfolk is erecting at Arundel will be about 50,000*l.*

The Institute of Architects' Conversazione.—The annual *conversazione* for 1870 will be held at the Rooms of the Institute on Wednesday, the 22nd of June.

Whitwood Mere Church, near Castleford. A memorial window, executed by Mr. J. W. Knowles, of York, has been erected in this church. The subject is, "Christ blessing little children."

TENDERS.

For house at Tufnell Park, for Mrs. Bovet. Mr. G. Truefitt, architect:—

Williams & Son (accepted)	£1,190 5 0

For rebuilding, repairing, making good, and reinstating damages caused by fire, at 240 and 242, Pentonville-road. Messrs. Lansdown & Pollard, architects:—

Nightingale	£426 0 0
Cullum	365 0 0
Batchelder	347 0 0
Bowman	317 0 0
Marr (accepted)	273 0 0

For alterations and additions to house at Paddock Wood, Kent, for Capt. Edgworth Horrocks. Quantities by Mr. T. Ladds:—

Anscomb	1,708 0 0
Adcock & Rees	1,706 0 0
Strange & Son	1,571 14 0
Matthews	1,533 9 0
Tunbridge & Denne	1,491 0 0

Reseating and restoration of the nave of Chaldon Church, Surrey. Mr. R. Martin, architect:—

Francis	£465 0 0
Waid	393 15 0
Chappell	387 5 0
Saker (accepted)	309 16 0

For new kitchen, bakehouse, and stores, at Grove Hall, Lunatic Asylum, Bow, for Mr. E. H. Eyas, exclusive of cooking apparatus. Messrs. Tolley & Dale, architects:—

Rivett	£1,473 0 0
Williams & Son	1,468 0 0
Conder	1,397 0 0
Ennor	1,329 0 0
Killby	1,256 0 0
Sewell & Son	1,224 0 0
Wicks, Bangs, & Co.	1,149 0 0

For new transepts and lecture-rooms to Rock Ferry Church, Cheshire. Messrs. W. & J. Hay, Liverpool, architects:—

Forde	£1,400 0 0
Booth & Richards	1,300 0 0
Fisher	1,277 0 0
Harkness & Dempster	1,273 0 0
Cameron	1,248 0 0
Hurst	1,246 0 0
Bleakly	1,200 0 0
Low	1,199 0 0
Thomson & Cook	1,187 0 0
Dobson (accepted)	1,164 0 0

For new school-room, Prince's Park, Liverpool. Messrs. W. & J. Hay, architects:—

Denton	£995 0 0
Yates	949 0 0
Roberts	929 0 0
Thornton	800 0 0
Nicholson & Ayre (accepted)	794 0 0

For Congregational chapel and schools, Splottlands, Cardiff. Messrs. G. Habershon & Pite, architects:—

Jones	£1,626 0 0
W. & T. Webb	1,480 0 0
Franklin	1,258 0 0
Seager	1,220 0 0
Shepton	1,219 0 0
Bolt & Co.	1,150 0 0
Price	1,145 0 0

For completing seven houses at Addiscombe, for Mr. Woodroffe:—

Carpenter	£616 0 0
Pierpoint	563 0 0
Selkirk	370 0 0
Souper	319 0 0

For chapels, lodge, boundary-walls, and formation of roads, for new cemetery, at Masbrough, Yorkshire. Mr. W. Blackmoor, architect:—

Chadwick (accepted)	£1,780 0 0

Accepted for new church schools, at Eastwood, Rotherham. Mr. W. Blackmoor, architect:—

Ripley (mason and bricklayer)	£322 10 0
Gardner (carpenter and joiner)	145 8 0
Jarvis (slater)	49 19 0
Gummer (plasterer)	18 10 0
Greenwood (plumber and glazier)	31 0 0
Wright (painter)	12 0 0

For the erection of a house and shop in the Roman-road, Old Ford, Bow, for Mr. J. Mardment. Quantities not supplied:—

Rovett	£620 0 0
Pavitt	497 0 0
Alexander	495 0 0
Lee (accepted)	490 0 0

For new rectory at Broadstairs. Mr. E. J. Tarver, architect. Quantities supplied by L. C. Riddett, surveyor:—

	House.	Stabling.
Wilson	£2,275	£194
Scriven & White	2,250	196
Shearburn	2,173	194
Capps & Ritser	2,052	178

For alterations and additions to residence, at Godalming, exclusive of graining, papering, &c. Mr. H. Peak, architect. Quantities not supplied:—

Pink	£1,798 0 0
Moon & Son	1,690 0 0
Mitchell (accepted)	1,670 0 0

For englargement of the male infirmary, at the Guildford Union. Mr. H. Peak, architect:—

Taylor & Downs	£430 0 0
Mason	379 10 0
T. & J. Lee	343 0 0
Dickinson	339 5 0
Garnett (accepted)	323 0 0

The Builder.

VOL. XXVIII.—No. 1427.

Salisbury, Sarum, and Surroundings.

BEFORE exploring Old Sarum, which is close to the thirteenth-century city of Salisbury, and where, as we have said, the early history of the latter can be best grasped,* those who are visiting the neighbourhood for the first time should go on to that stone puzzle, Stonehenge, and try to satisfy themselves, if they have looked into the arguments on both sides, or rather on all sides, whether it be pre-Roman or post-Roman, — pre-historic or merely non-historic, —whether reared by the mystic Druid when wild in woods the British savage ran long before Cæsar had heard of him, or in that strangely obscure period, the Arthurian Round-Table time, in between the going of the Roman and the coming of the Saxon,—who it is known called the place *Stanhengist*, or the hanging stones. It was evidently an antiquity of unknown origin in the eighth century, and we see stronger reasons for believing that it was set up before the Roman domination than that its erection followed their departure. This marvellous memorial, looking like "the bowels of a mountain turned inside out," as Stukeley graphically describes its present aspect, should be religiously preserved. The plough and rights of property are gradually breaking down the outlying barriers and ancient ways; the cultivator approaches it nearer and nearer; and the time is not far off when it will be incumbent on the country to secure its inviolability by purchase of the site. The fallen stones, too, where the original position is obvious, should be raised and replaced —a good work for a good body, the Wiltshire Archæological Association, to undertake. Once seen, Stonehenge can scarcely be forgotten: the dignity of the great trilithons is something surprising.

Coming back to Old Sarum we find, with much for doubt, a great deal that is certain and unmistakeable. If there be no positive evidence that this remarkable elevation, with its crater-shaped central mount, and early known as *Sorbiodunum*, the dry down, was a British fortification, there seems great reason to believe that it was; and we do know by testimony undeniable that it was occupied by the Romans, who left scattered over the soil in every direction dated metal memorials of their occupation, in the shape of coin from Hadrian upwards. That it was an important Saxon city the evidence is conclusive: we have documents dated about the year 720, conveying lands to the church of St. James, in "Sarisbyrig," and an order by the great Alfred, dated 872, translated thus:—"I, Alfred, king and monarch of the English, have commanded Earl Leofric, of Wiltunshire, not only to preserve the castle of Sarum, but to make another ditch to be defended by palisadoes." Afterwards comes here William the Conqueror, to impose military tenure. In his successor's reign, it is made the seat of the episcopal see in place of Sherborne; and then a cathedral is built, and part of the fortified area is held by the clergy and part by the castellan. This arrangement lasts a century, but with many squabbles, and at last the church throws off the military rule, and the new cathedral, such as we see it, is commenced in the plain below.

The Pope's Bull, A.D. 1218, for the removal of the cathedral, says,—"that forasmuch as your church is built within the compass of the fortifications of Sarum, it is subject to so many inconveniences and oppressions that you cannot reside in the same without great corporeal peril; for being situated on a lofty place, it is, as it were, continually shaken by the collision of the winds; so that while you are celebrating the divine offices, you cannot hear one another, the place itself is so noisy: and besides, the persons resident there suffer such perpetual oppressions, that they are hardly able to keep in repair the roof of the church, which is constantly torn by tempestuous winds: they are also forced to buy water at as great a price as would be sufficient to purchase the common drink of the country: nor is there any access open to the same without the license of the castellan. So that the people were sometimes denied entrance."

It was a "dry down" in more senses than one. The church being gone, Old Sarum dwindled on until Edward III. gave a formal order for its destruction, granting to the dean and chapter all the stone walls of the former church for the improvement of the new cathedral and close.

A walk around the place is full of interest. It is not one of those earthworks that call for faith and imagination: the whole plan is clear. The area within the entrenchments is called about 28 acres; the outer fosse is from 80 ft. to 100 ft. deep; the west and east entrances are strikingly obvious, and near the latter are seen some large masses of concrete, part, probably, of the gateway in the Mediæval outer vallum. Close by, in the plain, lies the New Sarum, with the cathedral uprising in its midst. Were we not right in saying that its early history could be best grasped amidst the neighbouring earthworks?

Of the more ancient church there is still a memorial. In uncovering the foundations of the cathedral in Old Sarum, a large key, doubtless that of the building, was found near the site of the west door, and, with a smaller key, discovered near the site of the high altar, is now to be seen in the Salisbury Museum, and serves to lock together with tangible bonds the old and the new.

This museum contains many things of interest, and has been well looked after by Mr. Nightingale, of Wilton, and Mr. E. T. Stevens. Salisbury has seldom been without a cultured man or two taking interest in its antiquities and history. The late Dr. Fowler, whose portrait hangs over the door in the Museum, and who would have been 100 years old if he had lived two years more (he was born in 1765, and died in 1863) was one of the most valuable of them. That he early took an interest in science is shown by the circumstance that when he died he was Father of the Royal Society.

The value of a local museum of this sort is immense: it serves, amongst other good offices, to prevent the dissipation of matters of interest. Thus a cross of Limoges Champlevée enamel turned up a fortnight ago, has already found its way there, and is safe.

The greater number of the Mediæval objects were found during the excavations that were carried on in Salisbury a few years ago, for drainage purposes, when active friends carefully preserved all the relics that were brought to light. As might be expected, few are earlier than the thirteenth century, at which time, as already said, the inhabitants of Old Sarum began the new city.

Attached to the county collection is a singularly valuable museum, founded by Dr. Blackmore, and which bears his name. At his cost a handsome open-roofed building, in the Mediæval style, designed by Mr. Harding, and decorated by Messrs. Harland & Fisher, was erected at the back of the county museum, and with its contents, munificently made over to the city for ever. The collection illustrates exclusively the pre-, or, at any rate, non-historic times, and is arranged under four heads,—Remains of Animals found associated with the Works of Man; Implements of Stone; Implements of Bronze; and Implements of modern Savages,—which serve to throw light on the use of similar objects belonging to pre-historic times. Recollecting that it was not onger ago than 1840, when the late M. Boucher de Perthès first called attention to the human-worked flints found in the drift of the Somme valley, and that it was in 1857 when Mr. Prestwich and Mr. John Evans verified the discovery on the spot, the enormous collections of such implements made since in all parts of the world are little less than astounding. The various kinds of Celts that have been discovered,—not *Kelts* by the way, the name has nothing to do with races, but comes from *celtis*, a chisel,—may be well studied in the Blackmore Museum, as may be the ancient lake dwellings of Ireland, Switzerland, and America. The modern discoveries on which the fact was established that early inhabitants of Switzerland lived in huts supported on piles above the surface of water must not be dated farther back than 1853. Herodotus describes a Thracian tribe as living in such dwellings in Lake Prasias, now in modern Roumelia; and we have accounts of African and other tribes doing the same thing still. The illustrations of tumuli and mound cities are valuable, and there is a very interesting model of ancient pit dwellings explored at Highfield, near Salisbury, in 1866. These pits are chiefly in groups communicating with each other. They are of beehive form, ranging in diameter at the bottom from 5 ft. 6 in. to 7 ft., though in some few cases they measure 14 ft. They are carried down to a depth of from 7 ft. to 10 ft. in the soil, and a shaft about 3 ft. in diameter seems to have afforded entrance to each group of pits. The men of Salisbury of that period did little more for their personal comfort than rabbits, and something less than beavers. Implements of flint and of bone were found in these pit dwellings, including some horn combs, with the teeth broken off, that closely resemble some in recent use by the Esquimaux for scraping fat from the backs of skins, excepting that the latter were made of wood with the sharp claws of birds lashed to them.

It will afford a contrast if we go from the contemplation of these retreats of our early predecessors to one of the historic homes of the neighbourhood, say Wilton House, "Pembroke's princely dome," filled with works of art and ingenuity—results of the highest intelligence—enjoyments and elevators for all time.

This house is about three miles from Salisbury, and is most liberally opened to the public. Holbein and then Inigo Jones were concerned in its first erection. It is best known by the collection of antique sculpture it contains, commenced in 1678, when the then Earl of Pembroke bought part of the Arundel marbles. It is curious to note how much less pleasure the majority of visitors find in the examination of such works than in viewing a collection of pictures. Many, indeed, who would contemplate with interest the sculpture round the doorway of a Mediæval cathedral, often distorted and ill-drawn, even if vigorous and expressive, look coldly and carelessly on the more perfect pro-

* See p. 437, *ante*.

ductions of classic art, scarcely recollecting, even, the astounding fact that these in many cases unapproachable works were executed two thousand and more years ago. The reason is not difficult to find, but we will not stop just now to look for it. The marbles at Wilton greatly differ in value and interest. The same may be said of the pictures, though the collection as a whole justifies its reputation. The large Vandyck, representing Philip Earl of Pembroke and his family, although greatly injured by time and restorers, is a noble picture worth a journey; to say nothing of the same painter's Charles I., Holbein's Father of Sir Thomas More, and the remarkable little diptych of King Richard II., the second leaf having on it a presentation of the Virgin and Child. Having been painted early in Richard's reign, it has been mentioned as evidence that oil-painting had been practised previously to its supposed discovery by Van Eyck about 1414, but Waagen points out what seems to us correct, that it is in tempera. The execution is singularly delicate. In the grounds, a bridge by Holbein, a view of Salisbury Cathedral, seen between two masses of trees, and recollections of Sir Philip Sidney and his "Arcadia," occupy the thoughts.

Every one knows of the church at Wilton, built at the cost of the late Lord Herbert of Lea, then Mr. Sidney Herbert, and fully described in earlier volumes of this journal.* The design is founded on the churches of Santa Maria and San Pietro, at Toscanella, and the interior glows with marbles, mosaic work, colour, gilding, and stained glass.

There is nothing better, however, in the building let us say, than the two monuments in memory of Lord Herbert and his mother, the Countess of Pembroke, executed by Mr. Birnie Philip, and illustrated in the *Builder* in 1864.

How far the erection of this costly church helped to lead the widow of its illustrious founder to the Church of Rome has yet to be traced.

Going out another three miles on the other side of Salisbury, Longford Castle, much less known than Wilton House, is met with,—a quaint casket with rare contents. The collection of pictures is surpassingly interesting. Waagen, in his book, grumbles greatly about the way in which, having obtained admission with great difficulty, he was hastily driven through the rooms. A different system prevails now; for, though our visit fell on a day when the rooms are not supposed to be open, we were received with the greatest politeness, and allowed to loiter as we would. And a rare treat it is. So far as regards Holbein, it is not too much to say that, to appreciate fully the merits of that great master, Longford Castle must be visited. Here is found the life-like portrait of Erasmus that he brought to England, with a letter from the original, to introduce him to Sir Thomas More. On the frame is this quotation,—"*E tenebris clarum doctrinæ tollere lumen qui felix potuit primus Erasmus erat.*" Holbein's portrait of Eagidius, the traveller, to whom also Erasmus had introduced him, is another fine work; but the grandest of his pictures is a large canvas, showing two male figures, the size of life, richly dressed, with a table, philosophical instruments, and music. The title given to it, the Two Ambassadors, is unsatisfactory. A little study would, probably, bring out something less so. The German words on the music are readable; the dagger of one of the figures and a book are both marked, "*Ætsuæ*, 29." With or without the desired knowledge, however, this is a wonderful work. Claude's well-known "Morning" and "Evening;" Titian's portrait of a sculptor; the Escurial, by Rubens; Carlo Dolce holding his own profile; Teniers, by himself; Guido's head of a Magdalen; a Queen Elizabeth, by Zuchero; and a Spanish admiral, by Velasquez, are other pictures to remember. Nor can we omit to note in the not very attractive chapel, a triptych which, if not by Albert Dürer, as was long thought, is, nevertheless, a remarkable painting. On all sides are noticeable things; amongst them the marvellously worked steel chair, with its hundreds of small figures in relief, which was presented to the Emperor Rudolph II. by the city of Augsburg, and excited astonishment at South Kensington awhile ago. Thomas Ruker, who made it in 1577, has put his name to it. He was one of whom all the Smiths may be proud.

* See also a paper "On Early Christian Buildings and their Decorations; illustrated by Wilton Church." By Geo. Godwin. *Journal of the British Archæological Association*, vol. xv., p. 131.

The castle, so called, is curious in form. Sir Thomas Gorges, married to a Marchioness of Northampton, employed the well-known John Thorpe as his architect, and built it about 1591, in the shape of a triangle with huge circular towers at the angles, and a moat around.* The late Lord Radnor began to turn it into a hexagon, but left it unfinished. The towers give it a character of its own, but the details do not pay for close inspection. Gwilt says a diagram of the Trinity was drawn in the middle of the triangular court: we had no opportunity to see if this still remains. Gossip longer, however, we may not, though these are but a few of the surroundings of Salisbury and Old Sarum.

NEW PALACE AT WESTMINSTER.

PROPOSED ADDITIONS AND ALTERATIONS FOR NEW REFRESHMENT ROOMS.

EVER since the year 1863, the necessity of enlarging the dining-rooms of the House of Commons has been recognised, and the architect (Mr. E. M. Barry) has, as our readers are aware from notices in these columns, prepared numerous designs for the purpose. The select committee on this subject, of which Mr. Ayrton was chairman, has just issued a report, recommending the adoption of a plan. This plan is somewhat oddly termed the First Commissioner's plan, but having examined it, we find it, in fact, a part of Mr. Barry's scheme of last year, having been copied from his plans, which have been approved by committees of Lords and Commons. It proposes, 1st., the conversion of the conference-room and adjoining tea-room into new dining-rooms; and, 2ndly, the erection of a new peers' committee-room, in lieu of the conference-room. It appears that Mr. Barry suggested the first arrangement in 1867, when the kitchen committee thus reported on his plan:—"That Mr. Barry has now suggested a new plan for improving the accommodation, viz., by converting the present conference and adjoining committee-rooms into a large dining-room for both Houses of Parliament, in lieu of their present separate dining-rooms, which could be used for tea-rooms, or for other purposes; and they are of opinion that this plan is preferable to any yet produced before your committees, and from inquiries they have made, they have reason to believe that such an arrangement would give general satisfaction." The same committee reported last year, that "they saw with satisfaction that in the new plans lately laid before the House by Mr. Barry, it is proposed to adopt the original proposition of converting the present tea-room and the conference chamber into new dining-rooms."

In order to meet objections raised by the Lords' Committee, Mr. Barry suggested the second arrangement respecting the substitute for the conference-room in 1869, and the Lords' Committee thus reported upon it last session:—"The committee approve of the new conference or committee room proposed in the new plan submitted this day by Mr. Barry." They now further report (p. 8) that they "approved" Mr. Barry's plan of last year, and are willing to "accept" Mr. Ayrton's version of it, if he will alter the entrance in accordance with Mr. Barry's proposal.

We are credibly informed that Mr. Barry's design has not been paid for, as he only asked for a fee of fifty guineas for attendances on the committees' and the preliminary negotiations, expecting, according to custom, his remuneration when the plans were carried out.

Various grave objections to the present plan will occur to our art-readers from an architectural point of view, and there are, in addition, some obvious practical inconveniences in the changes made in Mr. Barry's plan. Thus (1.) the entrance to the new committee-rooms is so contrived that the public must ascend five steps in order immediately to go down five more before entering the room. (2.) The serving-room has no external light or ventilation, and will be very objectionable. (3.) The kitchen is narrow, being 14 ft. 9 in. wide, and only 12 ft. 8 in. high, or a few inches higher than the present kitchen, the lowness of which is inconvenient. (4.) The rooms on the ground-floor under the new committee-room will be much darkened. All these defects are interpolations.

It will be easily seen from the foregoing remarks that the work requires architectural skill; it is no mere matter of routine which can safely be entrusted to a clerk of works, as is shown by the fact of Mr. Ayrton's estimate being no less than 6,600*l*. It embraces new building, as well as alterations, and will affect the architecture and convenience of the palace both externally and internally, and Mr. Gladstone and Mr. Lowe led the House of Commons and the public to believe that an architect would be employed for such works, and that Mr. Barry should be that architect. We have therefore a right to claim the redemption of this pledge.

As much is now said about cheapness, it is right to add that the present plan is a small portion only of Mr. Barry's general design of last year; for in that scheme was included, by order of the Government, a new library, dining-rooms, and committee-rooms for the lords, and also extensive offices for the purpose of joint refreshment-rooms for both Houses of Parliament, in connexion with the plan for a new House, recommended by the Select Committee on House of Commons Arrangements. This part of the scheme is now abandoned. The proposed new peers' committee-room is, however, Mr. Barry's suggestion; and, as Mr. Ayrton has copied his proposal, this part of the estimate of the latter admits of comparison with Mr. Barry's estimate of last year. Mr. Ayrton's estimate, including the entrance, is 2,450*l*.; Mr. Barry's was 3,135*l*., but Mr. Barry's room was 2 ft. wider, and the floor was raised to get height for the new kitchen beneath, and so avoid the steps down. Mr. Barry's entrances were also larger and more convenient. It is therefore clear, that for the same things Mr. Ayrton's estimate and Mr. Barry's would not greatly differ. Moreover, Mr. Barry stated to the committee, last year, that his was a "covering estimate," and that he fully expected to be able to get the work done for less than was stated therein. On this subject we may quote, with approval, from the present Report, the following extract from the Report of the Lords' Committee (p. 8). Their lordships state, that "they are very sensible of the importance of observing reasonable economy in all public expenditure; but they feel that, in making permanent provision for the accommodation of the Houses of Parliament, it is desirable that all should be done in the best manner."

We say the same. It is not fair to the public to allow a public building of elaborate architecture to be tinkered by those who, by their own confession, are ignorant of architecture and incompetent to deal with it. It is not fair to Mr. Barry to appropriate his ideas, which he has given to the public on the supposition that, if they were adopted, he would be engaged to realise them, and to allow others to carry them out in a mutilated and unsatisfactory manner.

* Gorges died in 1610, and has a monument in Salisbury Cathedral.

OLD STAINED GLASS IN ENGLISH CHURCHES.

To possess an adequate acquaintance with the series of historic and artistic representations yet extant in the stained and painted windows of the cathedrals, chapels, churches, and ancient mansions of England, is a matter of no trifling importance to all professors, students, and lovers of architecture and of art in general.

We trust, therefore, that the following statement, drawn up, in the first instance, from the materials collected in the "Universal Art Inventory," referred to in a former number of our journal, will be found of use. As, however, the total number of buildings included in that catalogue falls short of a hundred, there can be little doubt that the list, although we have ourselves doubled its length, is still susceptible of very considerable augmentation.

The first step to this desirable end we take to be that now accomplished. What has been collected by the care of Mr. Cole, is now presented in a clear and compact form, separated from the foreign examples, and augmented by collection of the best authorities, to our readers.

Every architect, every clergyman, every proprietor of a historic mansion, in England, may now see, by a glance at our pages, whether the existence and the character of any stained-glass windows under his care, are duly recorded or no. In the latter case, we trust that few of such guardians of these relics of an important art will hesitate to fill up the gap which exists, and which is now brought to their own personal knowledge, or to communicate, in the proper quarter, the information at their command.

They should specify, 1st., the nature of the

building; 2ndly, the locality; 3rdly, the form of window; 4thly, the subject and mode of treatment; and, 5thly, the date, with the reasons for its determination. If any existing description be accessible, it should also be indicated.

The stained glass known to be now existing in this country, of date earlier than the year 1800, A.D., may be divided into seven groups, each containing the production of a century.

Glass of the Twelfth Century.

Only five examples of twelfth-century glass are recorded in the Inventory.

A window of the church at *Brabourne*, Kent, was at one time considered to be the only example of glass of the twelfth century in England. It contains geometrical patterns, slightly painted.

In the north aisle of the choir, and also in the Trinity Chapel, of *Canterbury* Cathedral, is stained glass of this period, representing the figure of Thomas à Becket, and medallions filled with minute figures.

In the vestibule of the Chapter House, *York*, are fragments of Norman glass.

In the Church of St. Denys, *York*, are the remains of a "Jesse window," attributed (doubtfully) to the year 1200.

The most important example of Early English stained glass in England is to be found in the great rose-window in the north transept of *Lincoln* Cathedral. It is dated "about 1200 A.D." In the central part is a representation of the blessed in Heaven, with Christ sitting in the midst. In the sixteen circles forming the outer part of the window are symbolical figures; and in each of the four trefoils at the angles is an angel tossing a thurible.

These two last examples, if the dates are correctly determined, mark the period of transition from the Norman to the Early English period of architecture. Glass fixed in the year 1200 A.D. must have been executed before the close of the twelfth century.

Glass of the Thirteenth Century.

Fourteen buildings adorned by English glass of the thirteenth century, are named in the "Universal Art Inventory."

In the aisles surrounding the Trinity Chapel, *Canterbury* Cathedral, are three painted windows, representing the miracles of Becket. In that on the north side, on a medallion, is a representation of Becket's shrine, with the prelate issuing from it in full canonicals, to say mass at the altar.

In the Church of Little *Casterton*, Rutlandshire, is a lancet window, with stained glass, consisting of lozenges described by margins of different colours, forming panels, with bosses in the centre differently constructed and richly coloured, the general ornament being foliage creeping over the whole surface. This is referred to the latter part of the thirteenth century.

The east window of *Chetwode* Church, Berkshire, is of Early English glass, with pictures introduced into a white pattern. Date, 1265—1270.

The rose-window of the south transept of *Lincoln* Cathedral is filled with fragments of glass collected from different parts of the cathedral, and chiefly Early English. The colouring is very rich. The east window of the choir aisle contains medallions of Early English glass, thought to represent incidents in the life of St. Hugh. The east window of the south aisle contains medallions of the same series. Date, 1235.

The north window of the Jerusalem Chamber, *Westminster*, is filled with glass representing the Slaughter of the Innocents, the Stoning of Stephen, the Last Judgment, the Descent of the Holy Ghost, the Ascension, St. Peter walking on the Sea, the Decollation of St. John the Baptist, and a mutilated shield of late execution, bearing the arms of Bishop Williams, those of the See of Lincoln, and those of the Deanery of Westminster; all more or less patched. The date attributed is about 1272 A.D.

In St. John's Chapel, Merton College, *Oxford*, are painted side windows, of white patterns with pictures inserted, of the latter part of Edward I.'s reign.

Salisbury Cathedral contains in the nave and aisles the remains of an Early English Jesse window, dating about 1240 A.D., and medallions, representing Scriptural subjects, not earlier than 1270 A.D. In the side aisles are windows of ornamental patterns, varying in date from 1240 to 1270 A.D. In the south transept, and in the cloisters are remains of Early English glass.

There is a five-light east window, of a Decorated white pattern with pictures inserted, of the latter part of the reign of Edward I. in the church of *Selling*, Kent.

In the Chapter-house of *Southwell* Minster are remnants of glass of the reign of Edward I. There is a small medallion in the second window from the east, on the south side of the nave representing a knight on horseback, tilting with a long spear under his arm, of the same period.

In *Trumpington* Church, Cambridgeshire, are windows attributed to the thirteenth and fourteenth centuries.

In the Church of *Westwell*, Kent, the east window contains what is called "the only known fragment in Early English mosaic painted glass existing;" two figures only, of the Almighty and the Virgin, remaining of the original four. In one of the side windows are "quarrels," of brown lines, enclosed in a richly foliated border. Date A.D. 1220.

In the north transept of *York* Minster, is the beautiful window of five lancets, known by the name of the Five Sisters, filled with glass, representing foliage and the principal geometrical forms, in coloured and ornamented glass bands and leads. Date latter half of thirteenth century.

In the church and in the refectory, of the Hospital of St. Cross, *Winchester*, are fragments of Early English, mixed in with other glass.

The contents of two boxes filled with fragments of Early English glass, brought from New College, Oxford, are placed in the cloisters of the library at *Winchester*.

Three windows of stained glass were added to the Norman Chapel of St. John, in the Tower of *London*, in the year 1240 (see the "Guide to the Tower of London"). They are not referred to in the Inventory. It is also questionable whether the glass last mentioned as being placed in the cloisters of Winchester, is correctly attributed to the thirteenth century, as it is also stated to be "principally of Wykeham's time," which was the close of the fourteenth and commencement of the fifteenth century.

Glass of the Fourteenth Century.

Examples of glass of the fourteenth century are about as numerous as those of the thirteenth century. The Art Inventory cites thirty-one.

The east window of *Bristol* Cathedral is filled with painted glass of the date 1320 (restored in 1847), representing a tree of Jesse. The lower lights contain figures of the Virgin and infant Jesus, prophets, and kings; in the upper tracery lights is a display of heraldry. Four side windows in the chancel are filled with coloured glass of the same date.

The east window of the choir of *Carlisle* Cathedral is filled with stained glass of the time of Richard II., representing the general Resurrection.

Painted glass of the close of the reign of Edward II. exists in the chancel of the church of *Chartham*, Kent.

The east window of the church of *Checkley*, Staffordshire, has a window, of five lights, decorated with pattern glass, with pictures inserted; the Crucifixion in the centre, knights and bishops and saints on each side. The date is 1320. There are two side windows, each with three lights, with one tier of medallions.

At *Cranley*, Surrey, the east window of the church is of painted glass; one of the spandrels containing the figure of the Saviour sitting in judgment, with the globe in his hand, upon which three great periods are emblematically indicated. The lower third is wavy, to denote the flood; the centre contains the tables of the law; and the upper part bears the cross.

The east window of the choir of *Exeter* Cathedral is filled with painted glass; that in the lowest and middle rows representing figures of saints under rich and varied canopies; in the uppermost row, figures of Abraham, Moses, and Isaac; at the bottom, shields of early bishops and benefactors.

The head of the east window of *Froyle* Church, Hampshire, is filled with glass representing heraldic subjects, of the latter part of the reign of Edward II.

The great east window of the choir of *Gloucester* Cathedral is filled with the finest stained glass of this period in England. It represents a long series of saints, prophets, and Jewish kings, larger than life. Date, 1345. The side windows of the clearstory retain much of their original glass, of the same date with the east window.

In the Lady Chapel, *Hereford* Cathedral, is a window, from St. Peter's Church in the same city, representing our Lord bearing the Cross and the Crucifixion, &c.

The east window of *Hitcham* Church, in Buckinghamshire, is painted in compartments, the upper ones containing figures of angels, each standing on a wheel, inscribed, in Lombardic capitals, with the mystic titles of the orders of the heavenly hierarchy,—"Virtutes, Dominaciones," &c. The other windows of the chancel contain considerable remains of stained glass of the same date, the middle of the fourteenth century.

In the Church of *Kingsdown*, Kent, is a light containing a representation of the Virgin bearing the Infant, of the same date.

The west window of the nave of *Lincoln* Cathedral has the upper tracery filled with glass of the middle of the fourteenth century.

The same date is assigned to the east window of the Church of St. Lawrence, *Ludlow*, which represents the history of St. Lawrence, in twenty-seven compartments.

In the chapel on the south side of the choir of the Priory Church, *Great Malvern*, Worcestershire, are three four-light windows, two of which are divided into compartments by labels, and represent Scriptural scenes from the Creation to the Deluge. The third window contains full-length figures of St. Peter and St. Andrew, the heads of which are gone. At the sides are angels bearing the emblems of the Passion,—the spear, the reed, the sponge, the scourge, the ladder, and the nails. Date, fourteenth century.

In the chancel of the Church of *Norbury*, Derbyshire, are windows of white patterns, with shields of arms inserted. There are painted windows in other parts of the same church, also of the fourteenth century.

Fragments of fourteenth-century glass are inserted in the west window of Christchurch Cathedral, *Oxford*. In the middle of the large five-light window of the north transept is represented the murder of Thomas à Becket, the archbishop kneeling before the altar of St. Benedict, his cross-bearer, the Saxon monk Grim standing at the side, the figures placed upon a diapered ground of red and blue. This is attributed in the Inventory to the fourteenth century, but it should be noted that the portrait and the miracles of Becket in the Trinity Chapel, at Canterbury, are ascribed to the twelfth and thirteenth century. Becket was murdered in 1175 A.D. It is hardly likely that his miracles would have formed a theme for the glass-painters of the fourteenth century.

In the ante-library of All Souls' College, *Oxford*, is a painted window representing John of Gaunt wearing a regal crown, with the globe and cross in his right hand, and the sceptre in his left. He wears a blue mantle fastened under his chin with a gold brooch. Beneath is the inscription in old characters, "Johannes Rex Hispaniæ, Dux Lancastriæ." This window is thought to have been placed in All Souls' by the founder, Archbishop Chicheley.

In the ante-chapel and Chapel of New College, *Oxford*, are windows filled with figures under canopies, and with a series of angelic choirs, dated 1379–1386. In the Chapel of Queen's College is also some fourteenth-century glass.

In the east window of *Oxted* Church, Surrey, are four large quatrefoils, containing the mystic beasts, or symbols of the Evangelists,—the angel, the lion, the ox, and the eagle, upon diapered ground,—fourteenth-century work.

The east window of the Church of *St. Rew*, Cornwall, consists of five lights filled with glass representing the Stem of Jesse, with branches containing figures of kings, prophets, saints, and the Virgin and Child. Date, fourteenth century.

There is some glass, apparently of the reign of Edward III., in the window of the north aisle of the Church of St. Thomas, at *Salisbury*.

Large remains of the original painted glass, doubtfully attributed to the fourteenth century, are to be found in the windows of the Church of *Stanford*, Leicestershire.

In the choir of *Tewkesbury* Abbey are several figure and canopy windows, containing full-length figures of kings, knights, and saints. Date, A.D. 1320—1327.

In the west window of *Wells* Cathedral, amid some French and German glass of the sixteenth century, are the figures of King Ina, and of Bishop Ralph, of Shrewsbury, dating about 1385. The eastern and two adjoining windows of the choir represent a tree of Jesse, terminating with the Crucifix, Abraham, David, the Virgin and Child, Solomon, Daniel, Ozias, and an undetermined figure, in the upper compartments, and the Day of Judgment in the tracery lights.

St. George, in armour of character appropriate to the date, is in the north-east window. In the Lady Chapel the windows are a confused mass of fragments, with the exception of the east window, which has been admirably restored by Willement. The colouring of the whole is superb. In the chapter-house are fragments containing the arms of Mortimer, and those of France and England quarterly.

In the Church of St. Nicholas, at *Wilton*, near Salisbury, is some French stained glass, in the Early English style; one panel representing the Marriage at Cana in Galilee. The date is about A.D. 1400.

The stained-glass border of the east window of the chancel of St. Peter's Church, Cheesehill, *Winchester*, is attributed to the fourteenth century.

The west window of *Winchester* Cathedral is filled with the remains of painted glass, selected from different parts of the church after the destruction of the rest by the troops of Cromwell. The top central light of the east window of the choir is filled with some glass of Wykeham's time. (This is stated on p. 148 to be the fifteenth century, and on p. 149 to be the latter half of the thirteenth century. William of Wykeham died in 1404 A.D.)

The heads of two canopies in the east window of the chancel of St. John's Church, *Winchester*, are also attributed to the fourteenth century.

In the clearstory and aisles of *York* Minster are windows of stained glass, all of the time of Edward III.

There is glass of the fourteenth century in the western window of the north aisle of the Church of St. Martin-cum-Gregory, *York*.

Portions of glass remaining in the windows of the College Hall, *Westminster*, bear the initials N. L., being those of Abbot Litlington, A.D. 1376—1386. The wreck of the splendid windows of Westminster Abbey has been utter. When we find that even the substantial, *solid*, bronze saints that adorned the *grille* surrounding the monument of King Henry VII. have for the most part been mutilated or stolen, we can but wonder that so little glass should have escaped the ravages of fanaticism, or of mere mischief. St. James, St. Bartholomew, St. Michael the Archangel, and St. Edward, King and Confessor, and founder of the abbey, seem alone to have been respected by the Londoners. The weight of each of these spirited statuettes is such as to make it no easy matter to tamper with its integrity. The abbey is now being gradually filled with stained glass, twenty-two windows having been thus ornamented within the last five years.*

ARCHITECTURAL STUDIES.

ONE letter out of a dozen, to the same effect:—

"Dear Sir,—If you or any of your readers will tell me the usual course of studies or duties that a pupil has to go through to become a thorough architect, you or they will infinitely oblige—An Inquirer."

We wonder how many anxious architectural pupils, or would-be pupils, *habitantes in sicco*, are puzzling themselves for a satisfactory answer to the question which reached us in the above form a few days since. The very wording of the request is an indication of the uncertainty with which the subject is beset. "Studies *or* duties," there is the rub. Which is it to be, after all? Is our term of pupilage to be spent mainly in studying systematically under the direction of an experienced teacher, or does the existence of "articles" merely bind us to the performance of whatever commands our principal may lay upon us, with the chance of picking up in time what we can from the details of his practice? That is the question, or one of the questions, which has to be answered, and which the less careless and more industriously-inclined of our embryo architects are beginning to ask rather pertinaciously, in various forms and through various channels. What is the usual course of duties that an articled pupil is expected to perform, in a great number of cases, is an inquiry not difficult to answer. He will copy the letters and specifications, and will perhaps take the former to the post-office. He will be initiated into the delicate art (requiring some nicety of manipulation) of laying drawing-boards and mounting tracings on paper or calico. If in a metropolitan office, he will answer the "office bell;" if in a provincial one, he will do battle with intruding "travellers" at the counter. If he acquit himself honourably in these duties, and acquire a habit of using his instruments with neatness, finish, and despatch, he will be promoted to copy the working drawings for the contractors' use, and may, in time, acquire sufficient insight into the mysteries to enable him to assist in drawing out plans and sections from the rougher sketches of his employer, with the aid of figured dimensions or verbal directions. And here, if he be possessed of no more than ordinary sense and application, he will probably remain, and, at the close of his articles, will find himself in possession of such a degree of knowledge of technical terms, of the general language and provisions of specifications, of the usual mechanical process of getting up drawings, as will enable him to make a respectable appearance in the eyes of his friends and relatives, if called upon by their kind partiality to furnish drawings for a house or a shop-front. If, on the contrary, he be a clever young man, with a natural ability for drawing and designing, he may acquire during his pupilage sufficient knowledge of his master's style of designing to render material assistance in turning out ornamental detail, and even to improve upon the established design of his office, and may have the satisfaction, before his articles have expired, of contributing largely to the effect of buildings, the credit for which goes, of course, to the principal in whose name they have been erected. This is, on the whole, we believe, a pretty fair *résumé* of "duties" of architectural pupils in offices which represent the average of the profession; and, on the whole, it may be said that the master, if he receive a good premium with the pupil, has the best of the bargain; since the pupil, even if thoroughly stupid, is, at all events, merely a slight hinderance in the progress of the work; and, if clever, or even fairly sensible and industrious, he is pretty sure to be positively useful, without necessarily entailing any trouble on his principal, who is (practically, at all events) supposed to do his full duty to the pupil in letting him have the run of the office, and the facility for picking up familiarity with whatever constructive or ornamental work is going on. How far this can be called "education" towards the desired end of becoming a "thorough architect," we endeavoured to point out some time since in a paper,* to which we may refer those of our readers who are specially interested in the subject. In the "usual course" of things, we are not aware that any particular line of studies is recommended to, or exacted from, the architectural pupil, so that the most comprehensive answer as to what is required of him at present, would be "*duties* — disagreeable: *studies*— none."

We do not mean to imply a sweeping condemnation of all members of the profession who take articled pupils; although we fear that with regard to the course pursued in a good many offices no condemnation could be too strong. In other cases it may be said that the system is more to blame than the individuals who, partly from mere habit, fall into the usual way of working. An architect in busy practice has really little time to bestow on training pupils; and is, nevertheless, if he be a man of any note in the profession, probably often solicited to take them rather against his will. Nor, on the other hand, would we say that the system of office apprenticeship is without certain advantages which are wanting in the far more systematic academical system of France. Living amidst the routine of work, and in the way of seeing the actual carrying out of the buildings for which drawings have been made, must, if properly made use of, confer on the pupil a better and readier knowledge of the practical working of his profession than can be attained by only producing ideal designs in an *atelier*; though we fear even this advantage is often practically denied, for we have heard complaints from many architectural pupils that they were never commissioned to visit buildings in progress, and saw nothing of the work beyond the stage of the drawing-board and T-square. Taking the apprentice system at its best, however, it has the practical advantage referred to; and we would rather desiderate a union of this with the academical system, than an entire relegation of architectural education to the latter. It is not our object, however, just now, to indicate the bearings of a thorough reform in architectural education, which must be a work of time, but to give some hints which may be useful to students for the present. The serious defect in our present educational system is, in fact, its utter want of system; all systematic knowledge of the history and principles of his intended profession must be acquired by the student's own private studies out of office hours; and though we do hold, most positively, that every architect who accepts a pupil is bound to give him the best advice and suggestion in his power on these matters, we are willing, on behalf of the students, to give such hints as may tend to supply the direction which each ought by rights to obtain from his own professed and (generally) paid teacher.

In the first place, then, we would say to the young articled pupil, make yourself acquainted with the general history and (as far as you can) the general principles of architectural design. This is commonly the very last thing that is done or recommended; and the consequence is, as we have before pointed out, that a student merely learns, not the art of architectural design, but the peculiar manner of his own master, which may be bad or good, artistic or inartistic. Many men thus fall into a facility for rapidly producing drawings in an acquired manner, and achieve a pecuniary success in their profession thereby, without leaving behind them one building which is the result of artistic thought and study, or anything better than mere mannerism. The only way to steer clear of this is to take a wide view of the subject at first, to acquire a knowledge equally of all the leading styles of architecture, and especially of the two purest and most typical styles, the Greek and the thirteenth-century Gothic, together with some idea of the conditions both of society and climate under which they arose, and of the antecedent imperfect styles out of which they were developed. Such a study, if carried on in an intelligent spirit, even without going minutely into historical dates and details, cannot fail to aid the student in attaining a clear conception of the real nature and importance of the art which he is endeavouring to learn; and to the same end we would recommend him to endeavour to form and retain something like a definite conception of the general principles which should govern architectural design as distinguished from other arts. We say this not with a view to encourage idle and utopian theorising, for which there was never less time than at present, but to urge the architectural student to consider *what it is* which he is undertaking to do in becoming an architect, and not to be a mere blind follower in the groove in which he happens to find himself. We will not just now recommend a regular list of works for perusal; but we may mention, as books which will assist a beginner towards a comprehensive view of the history of his subject, the "Course and Current of Architecture," by Mr. S. Huggins (accompanied by a chart representing at a glance, by a simple method, the chronological and topographical relation of the various past styles). Among works dealing with principles of design, too, we may recommend attention to Mr. Garbett's little work on that subject (published in "Weale's Series"), and to Mr. Fergusson's "True Principles of Beauty in Art;" not as endorsing all opinions to be found therein (for, in the latter especially, there is much from which we should dissent), but as works thoughtful in themselves, and suggestive of thought to their readers. Hope's "History of Architecture," may be read, too, with advantage, as also various papers, both in recent and in earlier numbers of the *Builder*; and the student having, through these or such works, acquired a general idea of the history and scope of his profession, will be in a position to take up a more detailed study of various styles, of which Mr. Fergusson's well-known "Handbook" will, perhaps, furnish the readiest means in the first instance of study and comparison of leading characteristics of style, while there are numerous works, many of which we hope are to be found in most good libraries, giving more detailed information and illustration of the most important varieties of architectural style. What we specially recommend in reading, as will be perceived, is a regular progress from general history to detail: by this course the student will obtain a much clearer and more intelligible notion of his subject, as well as a better judgment in regard to modern architectural works, than by merely reading promiscuously and at random, however diligently. We must know something of the whole before attempting to judge of parts and those who have formed a pretty comprehen

* Remainder in our next.

* "Generalisation in Architectural Education:" in the *Builder* for September, 1868.

sive idea of the whole history of architectural taste will be the less likely to be led away by the false and often almost barbarous taste of the present day, and the *ignes fatui* of some modern writers on art.

So much for literary study of architecture. While pursuing this course of reading hinted at, the student will have been gradually acquiring, we shall suppose, in his office, familiarity with the use of his pen and pencil, and with the general aspect and meaning of architectural drawings, plans, sections, &c. He should combine his theoretical and his practical knowledge for the production of designs of his own (which he ought to be allowed and encouraged to do in the office on occasion, instead of being, as he commonly is, compelled to confine this kind of exercise to his home or his lodging). And here, the best plan is to propose to himself designs in certain given styles of certain dates and work them out, with attention to the known details of the style chosen. General plan and composition may be practised in this way with sufficient scope for invention, while the endeavour to obtain correctness of detail in accordance with the style chosen will help to fix the characteristics of the style on the memory, and, at the same time, lay the foundation of a true feeling for refinement and consistency of detail. This latter quality of consistency is an important one; and though (as our readers know) we should be among the last to advocate mere copyism in architecture, consistency of treatment is essential to the good effect of a building, and can be best fostered and attained by the study of consistent and complete styles of architecture, before the pupil has learned to think for himself. The attempt to cook originality intentionally, and "of malice prepense," is very likely to result in mere oddity and grotesque; a fact of which we are not without illustrations. A very improving practice too, and a very pleasant one, is that of sketching imaginary architectural groupings and scenes, wherein the sketcher may sometimes, even unexpectedly to himself, strike out hints and ideas worth storing up for future use. Detailed ornament and decoration should also be studied; wherein Mr. Owen Jones's "Grammar of Ornament" will be found very suggestive and instructive, giving the basis and leading characteristics of each of the most important schools of architectural ornament; and the student will do well to note the ornamental details of the buildings which he sees in progress from time to time, and observe which are most effective, and which retain their effect longest. We give these general recommendations towards cultivating and stimulating the faculty of architectural design, where it exists. But as to the feeling for balance and harmony of composition, and the power of invention in plan, outline, or ornament, of this it must, in a great measure, be said, *Nascitur, non fit;* and those who are without this natural and innate faculty will scarcely achieve it by study, though they may become good archæologists and useful practical architects or surveyors.

For of course we must not ignore the fact that architecture, though indubitably in its highest forms a fine art, is based on practical needs, and has its very important practical side: as to which it may be said that in the generation just passed away the practical view of the subject too much took precedence of the artistic, while at present there is some ground for saying that the reverse is the case. As to what degree of practical knowledge, and of what kind, is necessary to render a man "a thorough architect," it is difficult to say anything very decisive, the boundary of the profession being so very indefinitely marked. No one man could possibly be even fairly proficient in all the subjects which are considered to come, or are, at all events, from time to time brought, into the architect's province; and the opinions of architects themselves, as evinced by their professional practice and studies, are very various on this point. A general acquaintance with mechanical statics and dynamics will be the first *desideratum*, though even this is a knowlege which many successfully practising architects do not, we imagine, possess. Thence we should naturally proceed to a more detailed acquaintance with the principal materials in which we have to work; of building stones and timber of various descriptions, their peculiar qualities, enduring capabilities, and resistance to atmospheric effect; knowledge which will determine which material should be used in special situations. With this should be joined an acquaintance with the manner and principle on which various materials are worked and put together, on some of which heads there are several well-known treatises; but not, as far as we are aware, any that are very recent. Weale's Series contains several exceedingly useful little works giving the outlines, and sometimes a good deal more than the outlines, of various practical subjects, such as practical masonry, concrete, drainage, &c. A proper knowledge of the method of working materials will prevent the young architect from using a material in a manner and in situations unsuitable for it, and enable him to check contractors in so doing,—not n unimportant point; for we have known builders of some pretensions, when not sufficiently looked after, put together masonry as if it were joiner's work; and as to joiner's work done to imitate masonry, *that* is, alas! an everyday occurrence. What we should call a true feeling for the right and truthful use of material, is one of the qualities which distinguishes a genuine architectural designer from a jerry builder, or a mere draughtsman: in connexion with this subject the student may derive some hints from a paper on "Design in Relation to Material," in the *Builder* for January 2nd, 1869. The study of drainage and ventilation, what has been done and what remains to be done in these matters, must receive attention, and on these and other practical matters we should impress the student with the importance of keeping from the first a note-book in which to enter whatever special observations he may be able to make on practical points, both for impressing them on the memory and for future reference; remembering Bacon's aphorism, "that reading maketh a full man, writing an *exact* man." There are of course other materials besides what we have named, the conditions of which must be taken account of, as terra-cotta, tiles, slates, and other roofing materials, and methods of roofing, cements and plaster (the latter, let us say, to be used mainly for practical purposes, and very sparingly, if at all, in decoration). Then the architect, if he commence operations with a commission in domestic architecture, will find that his client expects him to be deep in the mysteries of cooking ranges, heating apparatus, bell-hanging, and other like matters of permanent house furniture, of which the more he knows the better, certainly; but concerning which we have our doubts whether they come so completely and decisively within the architect's province as is commonly supposed: at all events, he cannot compete with the tradesman who manufactures and the workmen who fix these things in practical knowledge of them, and must, in the end, trust a good deal to their honesty, though able to direct them as to general principles and methods, as to which Professor Kerr's work on "the Gentleman's House" will give useful information. A more important part, in our view, of the domestic architect's duties should be the overseeing and directing of the designs of the furniture and fittings in any house of any importance. Commonly, the architect's aid is dispensed with just at this point, so that too often the principal rooms of the mansion which he has designed with care are made hideous with upholsterers' designs of unmentionable nature, and bearing no relation whatever to the general design of the house. Architects should study furniture design and decoration, and endeavour to get this part of the business more under their control, which would be a first step towards seeing something more artistic displayed in the show-rooms of our leading manufacturers. Acquaintance with the use of the theodolite, and some degree of practice in surveying, may be considered part of an architect's education, as he will often find it necessary to survey a site himself; though we do not recommend the general union of the professions of architect and surveyor, which are, in fact, quite distinct in their nature and objects. In a general way, a knowledge of the leading facts and principles of chemistry (on which several published works supply adequate information), will give the architect greater certainty and facility in dealing with and providing for various possible failures of material; and a knowledge of geology in general, and of the particular strata of the district in which he is about to build, will not carry him "too far a-field," but will materially assist him often in the important duties of providing firm foundation, adequate water supply, and efficient drainage for the building he is about to erect. In such matters, however, experience and observation must go hand-in-hand with theory.

As to proficiency in drawing, in the method of exhibiting ideas upon paper, a thorough knowledge of and aptitude in perspective drawing is, of course, necessary; for an architect should, in fact, design in perspective, in his brain if not on paper; the geometrical elevation being the necessary method of putting his design into a workable and measurable form. This is, in fact, almost purely a matter of practice and habitude; for although elaborate treatises on perspective have been written, giving numerous examples of the method of dealing with various objects, &c., there is, in fact, but one problem in perspective drawing, viz., to find the apparent position on a plane of any given point on a geometrical plan and elevation, and any student who has once learned this can put it in practice in any form. After knowing the general principle of perspective, sketching from existing buildings will be one of the most certain and ready methods of attaining ease and rapidity therein, as well as being a most useful practice in calling the student's attention to details in the working out of a design which, on a mere inspection of the building, he would miss, in nine cases out of ten. He must, however, if he is able to make sketching tours, beware of misapplying the knowledge and practice so gained, and of working up in his own designs, without due consideration, materials which are only fitted for the position in which he has sketched them. Sketching is not to supply materials for "cribbing" from, or to supplement, but only to stimulate the architect's own exercise of thought. The use of water-colour in getting up views of buildings for committees and for other purposes, is of a certain value, and is a very pleasant study in itself, but of less practical importance than is sometimes supposed, as it does not necessarily tend to any furtherance of the capacity for strictly architectural design; on the contrary, a showy water-colour drawing is often made available to conceal various defects and lapses of design. The power of sketching the human figure with general truthfulness and spirit will enable the architect to indicate the sculptured decorations of his building in a presentable manner, and will further put him in the position to consider, in conjunction with the sculptor, the nature and character of the design which will be most suited to his building; but let him not be carried away with the idea of being sculptor (or cartooner) and architect in one. Any sculptor or painter will assure him that to design a large figure-subject well and correctly requires undivided study given to that one object: if he do not believe this, let him look at some specimens of architects' sculpture which are occasionally to be seen in drawings and in buildings (chiefly Gothic), and if these do not convince him, our caution is in vain.

In putting together some general hints on architectural study, suggested by the request which we have placed at the commencement of this article, we have purposely abstained from referring to the many facilities which exist in London for self-education, in the way of museums, exhibitions, lectures, and so on, as we are writing for the students of this country generally, and not for the metropolis alone. In conclusion, let us add, that no degree of general education which does not involve neglect of special education, will come amiss to the young architect; a knowledge especially of one or more of the continental languages will often put him in the way of getting more extensive information on subjects connected with architecture than he would otherwise obtain, and may qualify him for a commission which he could not otherwise conveniently carry out. It has been truly observed by an eminent writer* that there is no line of study which, if taken up thoroughly and carried out to its furthest limits, will not bring the student into contact with the widest fields of human interest and knowledge; and of no profession can this be more truly predicated than of architecture.

Velocipedestrianism. — According to the *Liberté*, a bootmaker has just invented a boot with small wheels, which will enable us to go as rapidly as a horse, with the facility of stopping at a moment's notice. What is this, however, but skating on wheels, which we have all seen at the Crystal Palace or elsewhere. It is a curious and no doubt pleasant recreative mode of locomotion, or velocipedestrianism, but can it be made suitable to roads? That is the question.

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* Mr. Froude, in his "Inaugural Address at St Andrews University."

DRINKING FOUNTAINS AND PURE SPRING WATER.

IT is a curious thing to note how the great powers that be sometimes go about things. There are two important questions at this moment before the British Parliament, of most momentous import to the whole British public: one is, that the said public shall be from henceforth compulsorily educated; and the other is, that intoxicating liquors generally should either cease to be drunk altogether, or, at least, the sale of them confined to very fashionable localities; and, to help to wean the poor helpless public from the temptaticns of alcoholic liquors, a society some time since sprang into existence, and a series of fountains, as they are termed, have been put up by it in all the poorer districts of London, for the purpose of supplying people with what the Drinking Fountain Society call "pure and wholesome water." Now, it is a curious fact, that all the fountains are carefully boarded up and the water-supply from them made to cease during the whole of the *winter* months and cold weather; indeed, just at the time when the sale of spirituous liquors is at its maximum, "to keep the cold out." Why is this? Surely the public, the lower orders, must drink in the cold weather as well as in the hot; and the temptations to go astray are quite as great, if not greater, in the cold of winter as in the heat of summer. But so it is, and doubtless it is all right and proper; but as the season has just commenced when all these boarded-up fountains are uncovered, and the water from them allowed to flow again (at least by day, for we have found them shut up through the night, even in summer), it seems worth while to say a few words about these drinking-fountains, on the fountains themselves, *architecturally*, and on the sort and amount of water which they supply. For this purpose we would call attention to the recent elaborate and instructive Report, with an appendix, on the subject of the London water supply: it would seem to call for some notice beyond what it is likely to meet with at the hands of those who look on it only as a sanitary matter. We are what is called a practical people, so that in the event of any change for the better taking place, either in the kind of water supplied to Londoners, or in the mode of its supply, we may be quite sure that *art* will come in but for very meagre notice, if for any at all. A few words, therefore, may not come amiss about it before anything is finally determined on. To begin at the beginning. *Rain*, says the "Report," is the source from which all water-supply is obtained, and there are *three* modes by which the water thus provided by nature is made available for the supply of towns. We ask attention to them. The *first* is to bore down into the porous strata, and thus to come directly to the purest of all water, that which springs up into wells, and which sometimes reaches the surface and bubbles up as springs. *Secondly*, that which is obtained from rivers, and which is the natural drainage of a country. The Thames thus drains not less than 6,000 square miles of land, *i.e.*, the rainfall over this area falls into the river bed. The *third* mode is by forming large reservoirs in hilly districts, and then to collect and store up in them the rain or surface water, this being conveyed by pipes to where it is wanted. Be it observed, that none of these methods ensures the collection of *pure* rainwater, the water being necessarily mixed with earthy and mineral matter by the fact of its passing through or over the ground on which it falls. It seems, therefore, a pity, as we have before urged, that some plan has not been devised for collecting pure rain-water from the tops of houses into tanks or cisterns. This would be a fourth mode of water-collecting. Rain, it is said, is the very purest and softest of all waters, it being the result originally of simple evaporation. If a glassful of Thames water be simply allowed to settle so as to become clear by the mud falling to the bottom of the glass, this water on being tasted will be found to be *soft* and almost like June rain-water. Or, should any one be bold enough and hardy enough to *bathe* in the river, he will find the water delightfully soft and *pure*,—pure barring the mud. If, then, after these two simple but bold experiments, the same person will dive into a common plunge-bath, and venture to taste the water from one of the common drinking-"fountains," as they are so poetically called, he will discover that though the water be said to come from the same source—the Thames, the bath water will feel like pounded ice, and as hard; and the taste from the "fountain" like unto some diabolical semi-warm mixture of he knows not what; as hard as cast iron and about as palatable! What, therefore, we would ask, do the water companies do with the water? Why not leave it alone, and allow the pure river water, after depositing its mud to find its way into baths and fountains in its *natural* state?

But, it may be asked, why take the "river" water, with all its impurities, about which there is so much in this Report, all the great scientific authorities contradicting each other about it, no two of them seeming to agree? Now, it so happens, says the Report, that no less than two-thirds of the Thames basin consist of porous and permeable strata, such as chalk, oolitic limestone, and sand and sandstones of various kinds, all of which receive and absorb a large proportion of the rainfall, and store it up in vast subterranean reservoirs, forming well and spring water, water made pure and palatable by great natural processes, costing nothing but the getting at it, by the sinking of wells and pump-pipes. This grand natural process reduces organic matters to a minimum, and mineral matters to the smallest amount, is independent of the seasons, gives uniform temperature, and the filtering process as perfect as can be; for, as the "sections" show, from 50 ft. to 300 ft. thick of sand, or limestone, or chalk, are gone through. It is something wonderful what an amount of evil is put up with by the poor British public. There is all this exhaustless supply of the purest and best of water under our very feet, and needing only the most common of mechanical appliances to come at; yet is it never even thought about, while the substance called water in common use is really unfit for any purpose whatever, either for washing or drinking.

But there is another aspect of this important subject which will, if not at present, at some future day, meet with the attention which it is worth. If we travel into countries and towns uncivilised and *barbarous* enough, such as Constantinople, or Damascus, or even Utah, on the Salt Lake, it will be found that not only is there a plentiful,—nay, magnificently liberal supply of the purest and most delicious of water,—but no pains and expense have been spared to render this supply not only complete, but pleasant to eyesight. The reader will see nothing of this in the Report. London and Constantinople or Damascus are wide enough apart; but in the last-named cities *the water is alike utilised and made beautiful*. Instead of the little dribbling, sickly streams which flow from our drinking-fountains, and which take their time to fill a wine-glass, and which in most cases spout out of a foot or two of paving-stone into a shallow basin, the size of a common dinner-plate, the real fountains to be found in those far-off and barbarous cities are really works of art, to be seen a mile off, with water enough to be at least seen and heard as it falls; a something to pause to look at, and a happiness to see. A photograph of a beautiful fountain worthy of the name, near the "Sweet Waters" of Asia, and quite a gem of Moslem architecture, may be seen in Gautier's Constantinople, together with another,—but far too big and luxurious for our shopkeeping nations,—that of the fountain of the Sultan Selim. Constantinople, be it observed, is a barbarous and almost heathen place, and a remnant of old and fast-failing times and ways of work, and unhappily modern improvement will consist, when it thoroughly seizes hold of this place, in doing away with all these quaint "water supplies," and substituting "taps" everywhere. Let the intelligent artist reader balance the loss and gain mentally and bodily. London improvements would seem now to consist mainly in pulling down as many houses as possible, and forming large, awkward, open waste spaces: would it not, we would ask, be a good plan to occupy some of these with drinking-fountains worthy, at least, of the name, with the water supplied from the lower strata, as explained in the Report,—*i. e.*, with well or spring water, of which there is such an inexhaustible supply. Such water is always pure, drinkable, and of even temperature, and constant in quantity. In these fountains the *water* for which they are constructed should show itself visibly—*i. e.*, it should be seen that the fountain was made for the water, and not the water for the fountain;—large open basins and a perpetually-running stream. It would be difficult to devise a plan more likely to be acceptable to the public, especially the poorer and out-door public. It would be easy to name some score of open spaces where "fountains" such as we have indicated would be useful and desirable. Nothing can be worse than the now so fashionable mode of improving London. Everything is destroyed, and there is nothing in idea to replace the old plan of streets, bad as they are thought to have been, or are. We may, before it is too late, learn something from Constantinople and other of those distant and really wonderful places, truly called cities, built and planned so long before science and "art principles" had any existence, but yet at a time and by a race of men whose ways we may well try to recall and humbly imitate and follow. There is, surely, a long distance between a Turk and an Englishman; and if the Sultan and his subjects are to be civilised by the adoption of English ways, let us borrow something from them before it is lost for ever.

One other thing there is in this water-supply question which ought not to pass without notice, as it is not a little curious, and shows the universality of the great laws of nature. Everybody has heard of the impurity of London river-water, one way or another; but the Report says, that taking properly-filtered samples of Thames water, we shall see an "extraordinary regularity in the albuminoid character of good town waters during summer months." Thus it would appear, that Thames water, Manchester water, Edinburgh water, and Glasgow water from Loch Katrine, show in a most remarkable way the great constancy in the amount of such impurities as *ammonia*. Thames water gets even sewage. Manchester water comes off the moorlands of Derbyshire, so it is pure; Edinburgh, from springs some miles from the city itself, yet is the per-centage of ammonia nearly uniform. It is certain, therefore, that there are great natural processes at work, always tending to equalise the quality of all natural water that is freely exposed to air and light.

EDINBURGH PROSPECTS.

WHEN George Heriot, goldsmith to James I., left his means and estate for the purpose of building and supporting an institution for the maintenance and education of poor boys in his native city, he set an example which has been followed by numerous imitators. Such is the plethora of wealth devoted to this purpose in Edinburgh that it has come to be looked upon as an evil, and means are being taken with the view of breaking through the monastic system, which is found to have a baneful effect upon the boys, and for giving a wider scope and aim to those richly-endowed institutions. Our readers will be surprised to learn that the endowments of these pauper palaces nearly equal in amount the whole educational endowments of the metropolis. Besides being hurtful to the boys, the use of these institutions has a demoralising effect upon well-to-do parents perfectly able to maintain and educate their offspring. In short, the building of pauper palaces has reached its acme, and those wealthy nobodies who wish their names to be associated with some grand structure must look for some other outlets. We may call the attention of such to the fact that Edinburgh has no town-hall, public library, or public baths,—deficiencies we hope ere long to see supplied in this or some other way.

No city of its beauty and importance that we know of has less ecclesiastical architecture worthy of admiration than Edinburgh. Trinity Church disappeared to make way for the North British Railway Terminus; Holyrood Chapel is in ruins; St. Giles's worse than a ruin; and the modern churches,—Classic and Gothic,—are mediocre in the extreme. This defect is likely to be remedied by the munificent bequest of the late Miss Walker, of Coates, to the Episcopal Church of Scotland. The estate left by the deceased is estimated at about 250,000*l.*; and, after paying all preliminary calls upon it, a sum of upwards of 200,000*l.* will be at the disposal of the trustees. The bulk of the estate consists of building-ground at the west end of the city, from which an excellent site,—at the western termination of Melville-street,—has been reserved, and on this is to be erected a cathedral at a cost of not less than 40,000*l.*

Provision is made for the officiating clergy; and in order to procure a suitable design, four or six architects are to be asked to compete. Other churches may be built and endowed by the trustees, the first of which to be at the east end of the city, to supersede St. James's, we

presume, which has an ordinary street front, in unison with the line of houses of which it forms a part.

At the southern suburb of Grange a new church is in course of erection, intended to commemorate the name of the late Dr. James Robertson, professor of church history in the University of Edinburgh. It will occupy a commanding site at the angle of Kilgraston-road and Strathearn-road, and is to be seated for a congregation of 800. It is to consist of nave and transepts, with a spire, 150 ft. in height, in the centre of the west gable. It is to cost 6,000*l*., and the design is the first realized one, in this branch of art, of Mr. Robert Morham. We shall watch its progress with interest.

A meeting has been held with the view of taking steps for the erection of a suitable memorial of the late Sir James Young Simpson.

A subscription list is also open to raise funds for a monument to the late eminent divine, Dr. Chalmers.

The Albert Memorial is still in the hands of the sculptors: we hope the question of site will be reconsidered. The Queen's Park, at the foot of Arthur's Seat, is about the last place where we would think of placing an equestrian group. The last public act of Albert the Good was to lay the foundation stone of the Industrial Museum. No more appropriate site for his monument could be found than in front of that building when the new street shall have been opened up.

KNIGHTSBRIDGE BARRACKS AND HYDE PARK.

BETWEEN the Corner and Albert Gate, and thence to the Guards Barracks, a distance of nearly one-third of a mile, the narrow border, varying from 100 ft. to 30 ft. in width, discloses the most perfect and tasteful example of shrubbed landscape gardening. With every difficulty to contend with,—a dull boundary wall, the backs of mean houses, and range of lofty, wide-spreading trees,—simply by raising and varying the surface with grassy hillocks and flowering shrubs, this hitherto repulsive margin has been transformed so as to excite the admiration of promenaders; and, together with the vicinal dell at the foot of the Serpentine, has become a thing of beauty. Here, however, all enchantment ends; for onwards, nearly a quarter of a mile as far as Prince's Gate, the Cavalry Barrack, with dull walls, gates, and open windows, borders the drive, without any intervening space. Sentinels at the entrances patrol the route; and, save that the officers' quarters stand back, presenting something of a more decent elevation, any factory or antiquated workhouse would form a boundary as appropriate to this route, which ought to be the promenade of fashion.

From the barracks westward to Queen's Gate, a little over a quarter of a mile, the park border is beautifully timbered, forming a wider margin to the drive; and here a shrubbery continued to the lovely flower walks, connecting Kensington Gardens, would perfect the whole circle, and prove a real solace to the walking community, as well as those who ride and drive; but so long as the barracks, which border the way for nearly 400 yards, occupy that position, it would be idle to attempt any further improvement; for, in fact, the quadruple range of carriages on the lounging drive turns back from the Serpentine Fall towards Hyde Park-corner.

Our metropolitan landscape gardeners certainly deserve public gratitude for the perfection of their floral display, and that under all the disadvantages of London smoke: the security of the flowers, and the admiration they attract, are sufficient evidence of the value of their labours. They have made a little Eden of the site of the old demolished guard-house, opposite the late toll-bar entrance to Kensington; and now the whole Park circle, save the interval from the barracks to Queen's Gate, has become a place of resort the most agreeable and refreshing.

The area covered by the Knightsbridge Barracks is rather over 4 acres: they occupy a quadrilateral space of 220 yards by 60 yards, and then the stables cover a plot of 153 yards, diminishing in width to 30 yards at the western extremity. Long since, on an inspection of the quarters, the building and its arrangements were condemned as unsuitable to troops. The first-floor of dormitories, *built over the stables*, is but 8 ft. in height. In front it looks into the most important highway of the metropolis; in the rear the windows open upon the fashionable drive, and the troopers lounge and recline in undress in full view of the passing traffic.

When first built, perhaps 150 or more years back, the location was no doubt appropriate: it was then ultra-urban, and on the road to the Royal Palace: it is now closed in by a dense population; and, as in all instances of the kind, the vicinage is tainted by night ramblers, and the low value of property there, save in public-houses (of which there are seven within 200 yards' distance), contrasts remarkably with the mansions and sites on the Kensington-road line.

At present the south side of the park has become of twentyfold value, excepting only this immediate line, where the barrack wall constricts the public highway along its whole course; and being in a densely peopled neighbourhood, it is not so suitable for troops as a position somewhat more distant, such as Chelsea, for instance, where the infantry guards have been for some time advantageously stationed. There they have certainly better barracks, good air, and more appropriate position; and, if not too far for infantry, it cannot surely be an inconvenient quarter for a cavalry regiment.

Taken in a financial point of view, the ground occupied at Knightsbridge, if sold or let for building, would realise an amount sufficient to erect barracks for the whole regiment of guards; whereas the present building accommodates but 420, and new barracks, near the infantry guards, would give domestic comforts to the men, while their withdrawal from the park would at once trebly enhance the value and change the aspect of the richest and most prized position of London,—the range between Knightsbridge and Kensington.

There is still another consideration which, as it affects the whole population, ought to have some weight, and that is the necessity for widening the Great Western-road, and the formation of a park side-walk under the shade of the fine range of trees extending along the whole south road to Kensington. The surrender of 18 ft. or 20 ft. of park border, *preserving the forest trees intact upon the footway*, and throwing the *present external footway* into the carriage-road, as recommended in last week's *Builder*, would in no sense diminish the effect of the park, whilst it would enlarge the driftway, on an average, 12 ft., and thus effectuate the improvement so earnestly desired by the Commissioners of the Hall of Arts, and by every resident of this fine quarter. The rapid advance of the Hall of Arts, of the South Kensington Museum-buildings, and of numerous residential structures which now occupy the important south-western district, demand the concession of an improved road and footway. The population has increased; and as the city spreads, every foot of free intercourse and park privilege becomes of vital importance. When the Kensington Guard Barrack was demolished, Government converted the space to a garden. A similar dedication to public uses of the Knightsbridge Barrack site would, doubtless, meet with general approval and gratitude.

CHURCH OF THE HOLY INNOCENTS, FALLOWFIELD, MANCHESTER.

THE corner-stone of the Church of the Holy Innocents, at Fallowfield, was laid on the 4th inst., with full Masonic ceremonial, in the presence of the Grand Lodge of East Lancashire, by Brother the Hon. Wilbraham Egerton, M.P.

The site of the new church, which has been given by Lord Egerton of Tatton, in addition to 1,000*l*. subscription towards the building fund, is on the north side of the new road leading from Fallowfield to Chorlton, and adjoins the Didsbury high road. Space is also provided for the erection of schools and a parsonage. The church comprises a nave, about 89 ft. by 25 ft. internally, divided into five bays or arches, 17 ft. wide, and about 62 ft. high from the ground to the ridge. On each side of the nave are aisles about 13 ft. wide. This portion of the church is lighted by a two-light window, having ornamental heads in each bay of the aisles, and by a large window of bold design in the west end of the nave. The clearstory consists of lofty coupled single lights, with cusped heads, in each bay, the pier between supporting the intermediate roof principals. From the moulded corbels at the foot of the hood moulds to the nave arches rise wall-shafts, with moulded caps and bases, which support the roof principals. The chancel is about 38 ft. long and 22 ft. wide, and is raised above the floor of the nave by several steps, which occur in the centre of the chancel-wall. The chancel is lighted by three clearstory windows on each side, and five in the apse, which is on plan a semi-decagon below and a semicircle above. On the south of the chancel are two moulded arches, opening into a side chapel or aisle, which is also connected with the south aisle of the nave by a single arch. On the opposite side of the chancel are the vestry, a lofty organ-chamber, with arches opening into both chancel and north aisle of the nave. The pulpit is placed at the north-east corner of the nave, touching the foundation-stone. The font is near the south porch, at the west end of the south aisle. The tower, which forms a second porch, and a spire, are at the east end of the south aisle, next to the chapel, and have been most carefully designed with reference to their appearance when executed. The exterior of the building will be executed *en pierre point*, with stone dressings to windows, &c., and the window-tracery may be of Berlin red terra-cotta; the main internal columns and arches to be worked in red Runcorn stone, with white stone for caps and bases. The church will accommodate about 700. The builders are Messrs. Ellis & Hinchliffe, and the architects are Messrs. Price & Linklater, of Manchester and London.

SOMETHING MORE OF GLASGOW.

THE majority of the city graveyards in and about Glasgow are in a very wretched condition. The Necropolis is very well looked after, as are two or three more minor ones, but we have visited a few which are simply a disgrace to any civilised community.

Extramural burial in Glasgow must become the order of the day. In a Roman Catholic burial-ground "Lairs" have been purchased and paid for, and yet others besides the owner's family and relatives have been buried within. A mean, money-grubbing, and unchristian desire has been shown on the part of those who receive the burial fees in this graveyard, with an utter carelessness and heartlessness demanding censure if not reprobation. Two or three miles outside Glasgow, at a place called Dalbeth, there is another Roman Catholic burial-ground, which was enlarged a few years ago. There are graves here, let us say charnel-pits, into which shattered humanity has been carted and shovelled down, not unwept by some,

"But unhonour'd and unsung."

Poor Pat and poor Sandy have gone down here through infernal traps in deal boxes, or coffins if you will, with a few shavings for their shroud, but no *De Profundis* for their souls. "It was good enough for them: if their relatives could pay for it they would have it the same as others." So runs the refrain. There are some natures who will speculate on making fortunes by the dead as well as by the living, and who, to use the words of Wordsworth,

"Would peep and peep and botanise
Upon their mothers' graves."

The laying out of old city graveyards, and making them places worth visiting instead of avoiding, making them contribute to the beauty and health of their locality—has not yet been attempted in Glasgow. London has, however, given a precedent, which may well be followed out with advantage.

Window gardening, which has done so much to elevate the taste and feelings of the poor in the low quarters of London of late years, is an occult science in Glasgow. We looked in vain through the dreary passes of Glasgow for these bright oases in the desert, but found them not. Where there is a love of flowers there cannot be a love of filth.

On the north and south sides we noticed several old thatched structures, and some of these are, in the vicinity of factories, where a spark at any time might, during the night, do the work of an incendiary, and result in a conflagration and loss of life that the city of Glasgow would never forget. These thatched houses on both sides of the Clyde ought to be at once condemned and removed; but we doubt if the sanitary authorities of Glasgow at present will dream of touching such picturesque bits on their social canvas, as they are so exquisitely charming and so highly inflammable.

At Whitchurch, a few miles out, there are some self-contained dwellings in course of erection for the working-classes. We may have occasion hereafter to say what we think of them. Of that class within the city we have spoken with truth and without exaggeration.

The present City Railway construction through Glasgow will not add to the beauty of the city, though it will certainly add to its prosperity. But we do not see why the underground system should not be attempted, as it could be with every chance of success. A tunnel under the Clyde, on the line of the Bromielaw, will also be soon, if it is not at present, a necessity.

CONDITION OF LINCOLN.

SIR,—Under the head of "Stagnant Lincoln," your last week's issue contains a letter that requires contradiction.

There are no fens in Lincoln or its immediate vicinity. The subsoil is lias, capped on the summit with the oolite, from which the cathedral, the castle, and other stone buildings are erected. The lower portion is covered by an alluvial deposit of sand, some two yards in thickness. The stone, sand, and lias clay are extensively used for building purposes and for brickmaking.

There are no dykes filled with stagnant water. The Witham, a running stream, delivers into a navigable pool called the Brayford, which also receives the waters of the Fossdyke, a canal cut by the Romans from the river Trent at Torksey, to the Witham at Lincoln. The Fossdyke is connected with the Trent by locks; and as the passage of every vessel through the locks necessitates the issue of a large body of water into the canal, it cannot be called a stagnant water.

The Brayford pool is bounded on two sides by wharfs and warehouses, on the other by the railways. The Fossdyke and Witham, flowing through it, run down to Boston. Locks are placed at their exit from the city, to enable vessels to unload upon the wharfs along their course.

With the exception of the new towns that have sprung up in the recently-developed iron districts, few places have progressed so much or kept so well up with the times as Lincoln; neither does the writer know a prettier place. Approached from any side it is a splendid picture. The blending of the various tints of the slates, tiles, stone, and bricks in the ancient and modern buildings on the crest and escarpment of the hill, mixed with the foliage in the grounds and gardens, is beautiful.

Along the edge of the table-land are built the Cathedral, the County Hospital, the Castle (including the county prison and Assize Courts), the Lunatic Hospital (where the system of non-restraint was first practised), the Penitent Females' Home, the Workhouse, and the N.L. Militia Barracks and Store-rooms. The city Assize Courts and prison are built lower down; and on the opposite side of the valley stands the County Pauper Lunatic Asylum.

Lincoln is the metropolis of the portable engine and agricultural implement trade. Its four principal factories employ several thousand work-people, whose productions are sent all over the world. There are also two large chemical works. An extensive trade is done in flour, malt, and grain. An excellent cattle-market is held weekly; and five lines of railway radiate from the city.

The assertion that the *Builder* is scarcely known in Lincoln is simply nonsense. Daily papers are brought in from Nottingham, Leeds, Manchester, Hull, Sheffield, and London; the first at five a.m., the others in due course as the trains arrive. Then there are the evening papers from Manchester and London by *last* trains. Three local newspapers are published and well supported in Lincoln. The Mechanics' Institute and Reading-room has been established many years with great success: the terms are low, and it is well attended.

A school of art was started a few years since, and its pupils rank among the highest in the Government reports. In the Grammar-school are educated many scholars, at a moderate charge. A fair proportion of them have obtained university distinctions, two recently at Cambridge.

An Act of Parliament was obtained a short time since, authorising the sale of some screeds of commons land, cut off by a railway. The proceeds were spent in draining, planting, and improving the remainder, and a good class of houses are being erected on the land sold. Another Act now awaits the royal assent to convert a further portion of commons land into an arboretum, a strip along the top to be sold for the erection of a superior class of villa residences. A large balance accruing from these sales is invested, and furnishes small annuities to aged householders and freemen.

All the churchyards are levelled, planted with shrubs, and enclosed. The cemetery-grounds are beautifully laid out, and kept in admirable condition.

Owing to the increase in population by the development of the local trades, original shares in the Waterworks Company, Gas Company, Corn Exchange and Covered Markets Company, and Bank are very valuable.

Workmen's cottages are in great demand, many being bespoken before the roofs are on. The following are some of the principal works now in hand:—New gaol for the Lindsey division of the county to hold 200 prisoners; two churches, one to accommodate 1,000, the other 500, sitters; Wesleyan schools, new infirmaries at the workhouse, a private estate of some four or five acres is laid out, and villas are being built upon it.

Tenders are accepted for pulling down the present Baptist chapel, and replacing it by a larger. The guardians have accepted tenders (about 1,300*l.*) for improving the sanitary condition of the workhouse, by altering the privies into water-closets, remodelling the drainage, and constructing tanks for filtering the sewage. Between 3,000*l.* and 4,000*l.* were recently granted by the county magistrates for the purchase of land, and arrangements for conveyance thereon of the sewage from the County Pauper Lunatic Asylum.

Market days are attended by a class of farmers second to none in wealth, appearance, and intelligence: a large influx of their servants visited the city lately, being May-day time; they were respectably dressed and well conducted; and to exemplify their prudence, in addition to their large purchases of drapery and other goods, 1,700*l.* were paid into the Lincoln Savings Bank by them in one day, exclusive of what might be paid into the Post-office Savings Bank.

When the new Lindsey prison is completed the few prisoners in the city gaol will probably be confined therein, the city assize courts and gaol removed, and the site appropriated for a new town-hall which is talked about, and is much wanted.

In passing through the city the river receives much of the sewage; and although it is flushed occasionally by means of the sluice-gates at the Brayford, a proper system of drainage is required. This is only a question of time: the Corporation have three schemes, by eminent engineers, and when the learned men of the country settle upon the best mode of disposing town sewage, that method will doubtless be adopted in Lincoln.

The want of a row of trees along the High-street cannot be construed into an aversion of the citizens to foliage in its proper place. If a man likes the church there is no reason why he should bestride its ridge. The Witham level is too low to admit of a continual stream of clear water flowing from it along the street channels; and I fear your correspondent, "Gargoyle," is not a ratepayer, or he would have reason to know that the Local Board are doing something

A LINCOLN HOUSEHOLDER.

WIND PRESSURE ON ROOFS.

IN an article on this subject, the *Engineer* says:—

Having ascertained the conditions of strains due to a uniform load upon the various parts of the roof, and tabulated the results, let another table be compiled showing the effects of a partial loading, and then the necessary counterbracing can be introduced. But there yet remains a very important element of stiffness to be added, very important element of stiffness to be added, namely, the wind ties. These are required not only to assist in resisting the external violence of a storm or hurricane, but also to prevent the pressure from underneath literally "blowing up" the roof. If the wind once gets "well under" a roof nothing but the fact that the greatest care and precaution has been bestowed upon its bracing will prevent it being carried away. We have known an instance in which, from want of attention to the proper tying together of the principals, the whole roof was lifted bodily off the side walls and landed in an adjoining field. The storm continuing, the walls gave way also, and the cost of restoring matters to their original condition amounted to 1,500*l.* The fault of most wind-ties is that they are not carried down low enough. There is no necessity for tying the principals together by wind-ties. They are already amply secured by the purlins and the whole covering in general. The point to be aimed at is to tie them back upon the respective supports, so that the principals could not be lifted without taking the foundations with them. Basing our estimate upon the data already assumed for the maximum pressure of the wind, the upward force would be equal to 55 lb. per square foot, and would consequently lift nearly that weight vertically. Unless, therefore, the insistent weight of the roof per square foot were greater than this amount, it would at any rate be able to be seriously shaken by a force of that intensity. The aid, therefore, of some further mode of securing the principals is evident, as roofs of moderate, and even large spans, do not equal in weight the figures arrived at by observation for the maximum wind pressure. The strength required to be given to a roof will be most accurately calculated by a due attention to those principles which theory dictates, and practice sanctions, but its rigidity and stiffness will be best provided for by experience, combined with a little of that "artifice" which every thoroughly qualified engineer knows when and how to employ.

SALISBURY CHAPTER-HOUSE.

SIR,—Permit me to state that I ascertained last autumn that the decay of portions of the ornamental wall-painting, inside the Chapter-house of Salisbury Cathedral, is most certainly owing to the effects of damp. I was *told* that exposed parts of this ornamentation owe their permanence to the use of a backing of slate.

A. H. GENT.

LABOURERS' COTTAGES.

ARCHITECTS WHO KEEP THINGS TO THEMSELVES.

DECENT dwellings for farm labourers are being built on the Dudmaston Estates, near Bridgnorth, for the Rev. F. H. Wolryche Whitmore; at Caynham Court, Ludlow, for Sir Wm. Curtis, bart.; at Rowfant, Sussex, for Sir Curtis Lampson, bart.; at Jermyns, near Romsey, for Mr. R. G. Linzee; and at Kirby Muxloe, near Leicester, for Miss D'Oyly. These works are being carried out from the designs of Mr. Birch, architect, who gained the Society of Arts' premium for such designs. Each cottage will contain a living-room, three bedrooms, entrance-porch, scullery, pantry, fuel-store, piggery, privy, cesspit, and ashpit. Architects who are afraid of having their plans published may take a lesson from these cottages. When Mr. Birch obtained the premium, he gladly availed himself of our pages for the wide publication of his drawings. Another architect who was asked to afford facilities for the publication, about the same time, of his design for such cottages, was "not such a fool," he said, "as to give the public the benefit of his plan for nothing."

What was the result? Mr. Birch has been engaged all over the country carrying out the plans he had frankly thrown open, while the careful gentleman, who was "not such a fool," has never been heard of since.

NOTES ON THE INCLOSURE ACTS AND THEIR RESULTS.

A PAPER on this subject was read by Mr. Richard Hall, Vice-President, at the ordinary general meeting of the Institution of Surveyors, May 23rd. In concluding it, the reader said,—

From the sketch of the legislation on this important subject up to this point, it will be seen that Parliament has fully recognised the great advantage of inclosing wastes and unprofitable land, and removing any rights that interfere with its free cultivation. From time to time, however, provisions have been inserted in the various Acts, in order to preserve open spaces for the public, and for large populations. Village greens cannot be inclosed, and recreation grounds and allotments for the poor may be set out, if necessary, in the cases of inclosures of waste land. Any proposals for dealing with commons near London, or other large towns, have been regarded by Parliament with great jealousy, and in the year 1865 a Committee of the House of Commons reported on the best method of preserving to the public open spaces in and around the metropolis.

Their attention was directed to the question of the inclosure of portions of commons by "approvement." This process is authorised by an old Act of Parliament, passed in the reign of Henry III.,—20 Henry III., cap. 4,—and known as the Statute of Merton. It was intended to enable the lords of manors to inclose (probably

for the purpose of improvement or cultivation) such portions of the waste as were in excess of the requirements of the commoners. The Committee recommended, amongst other things, that this statute should be repealed; at all events, so far as suburban commons were concerned.

In the following session, 1866, an Act was passed for the purpose of preventing the inclosure of commons, under the Inclosure Acts, within the metropolitan police district, 29 & 30 Vict., cap. 122. This measure also provides machinery to enable persons interested in such commons to apply to the commissioners to prepare schemes for their management, which, after the observance of certain forms, are to be submitted for Parliamentary sanction. By the commissioners' report this year, it appears that applications have been made to them in eight cases, but no scheme has yet been completed.

In the present session, a Bill has been introduced to extend the provisions of the Act of 1866 to commons within certain distances of towns containing 5,000 inhabitants and upwards.

Last year, a committee reported on the subject of the public recreation grounds and allotment gardens, set out under the Inclosure Acts, and suggested some alterations in those Acts, with a view to enlarging the powers of the commissioners. This session, the Government has introduced a Bill, proposing that as much as one-tenth part of the whole value of any waste land shall be appropriated for those purposes; and giving the commissioners power to reserve a recreation allotment in the cases of common field inclosures, if the public have been in the habit of using any portion of the land to be dealt with for such a purpose. Common fields have hitherto been exempt from this condition. Rides and drives for the public may also be set out, and the assent of the local authority is required before any land can be enclosed within certain specified distances of towns containing 2,500 inhabitants and upwards. . . . .

The beneficial effects which have resulted from inclosures can hardly be estimated too highly. In the cases of common fields the removal of the complicated rights and customs, which so much interfered with their profitable cultivation, has increased their value in a very great degree; it has also enabled the owners to effect operations of improvement, such as drainage; and the new roads which have been constructed have not only benefited the land dealt with, but afforded improved communication for the public and the neighbourhood.

I have frequently had occasion to make valuations in parishes enclosed by my father thirty or forty years previously, and have found the value four or five times as great as it was at the time of the inclosure. But land is not only improved from an agricultural point of view; it is frequently converted into building sites; and some inclosures of common fields, which I carried out in the neighbourhood of Cheltenham, may be referred to as instances in which, probably, the value has been increased tenfold. I remember a small common field, property which was looked upon as of so little value that it was left quite uncultivated, and hardly possessed an owner; the process of inclosure soon changed its character, and since that time it has been built over.

The inclosures of waste lands have also exhibited very interesting results. At Framfield, Sussex, the quantity dealt with was 2,000 acres, and the lands in respect of which rights of common were exercised extended into seven parishes, and comprised some 12,000 acres. It was very generally thought in the neighbourhood, that the value of the whole of the waste would hardly suffice to pay the expenses. The results were, however, satisfactory; for the portions sold to defray the expenses did not exceed one-eighth of the whole. Some of the land was comparatively worthless; but the prices obtained averaged about 20*l.* an acre, which was but little less than the price at which inclosed land had been selling.

I will not, however, weary you with instances of the improvements which are so generally familiar to us. Many members of this Institution can, no doubt, call to mind various interesting cases. It is satisfactory that in no single case within my own experience has the cost been so great as to render the inclosure unprofitable.

In reviewing this brief sketch, it appears that the working of the Inclosure Acts, under the superintendence of the Inclosure Commissioners, has very successfully carried out the intentions of the Legislature. The cost of inclosures has, probably, been reduced by as much as 50 per cent.; and, at the same time, the process has been accelerated and rendered uniform and certain. The interests of the public, as well as those of the poor inhabitants, have received their share of attention; and the present legislation is apparently tending towards the encouragement of the inclosure of rural commons, whilst it seeks to preserve open spaces for the recreation of large populations.

THE NEW WORKHOUSE FOR DARLINGTON UNION.

THE local Board of Guardians, towards the close of 1867, offered premiums of 40*l.*, 30*l.*, and 20*l.* respectively, for the best three plans of a model workhouse. In response 116 designs were forwarded, and an architect from London examined them, and decided in favour of "Nota Bene" (Mr. C. G. Adams, of Stockton), "Economist" (Mr. G. Styans, of York), and "A" enclosed in a circle (Mr. W. Snowdon, jun., of Bishop Auckland). The Board decided to give the first premium to Mr. C. G. Adams, whose plans they accepted. Tenders for the contract were invited, and Mr. Joseph McCormick was announced to be the successful competitor, at 11,799*l.* The work has since progressed under the direction of the architect, and the supervision of Mr. W. Simpson, the clerk of the works appointed by the Board. It has now nearly approached completion.

The length of the front of the main building is 157 ft. 10 in. It has moulded brick bases and moulded brick stringing running along at the height at which commence the springing to the arches, with a facia of black and white bricks placed alternately on each side of the central part of the building. In the centre is the principal doorway, with columns, bases, and carved capitals, moulded semicircular splayed arch, &c., and carved representations of animals. The whole front and returns of the main building are finished with a moulded blocked cornice. The roofs of the main building, and of the board-room, the porter's lodge, and receiving-wards are covered with Taylor's patent roofing tiles, and have the appearance of a gutter and ridge tile placed alternately. On the ground floor, at the east end of the main building, there is the master's room, 17 ft. 3 in. by 18 ft.; master's office, 18 ft. 6 in. by 18 ft.; infirm men's day-room, 20 ft. by 18 ft.; able men's day-room, 22 ft. 3 in. by 18 ft.; and two infirm men's night-rooms, one 30 ft. by 18 ft., and the other 20 ft. by 18 ft. Similar rooms are allotted to the able and infirm women, in the west end of the building. Separate hanging staircases, having iron balusters and hand-rails, lead to the men's and women's night-rooms. The main staircase is composed of wood, with cast-iron ornamented balusters, and mahogany hand-rail. This leads to the first floor, which is divided equally between men and women, similarly to the ground floor. On this floor is a staircase which leads up to the tower.

The infirmary, which is of considerable size, stands on the south side of the main building. It has a frontage of 77 ft. 10 in., and is 26 ft. in height. Attached to it are two wings, one at either end, which are each 49 ft. in length and 22 ft. 4 in. in height. All the walls and ceilings are plastered. The fever ward, which is also on the south side, is 85 ft. 4 in. in length, and 22 ft. 4 in. in depth. Attached to this building are a separate wash-house, laundry, and drying-room. The Board-room buildings comprise a porter's lodge, Board-room, receiving ward, vagrants' wards, clothes-rooms, drying closets, examining-rooms, with stone-breaking sheds, workshops, coroner's and dissecting room, and hearse-house, all one story high. The whole of the buildings are supplied with heating apparatus. Water-pipes are laid all round the building, with fire-plugs inside and out. The ground is laid out for the service of the different classes in the workhouse.

The new workhouse will accommodate 250 inmates and 50 vagrants, whilst the one at present occupied has only accommodation for about 135 inmates. The sub-contractors respectively were:—For joiners' work, Messrs. Gargett & Sons; for slating, Messrs. J. & G. Wharton; for plumbers' work, Mr. T. Johnson; for heating apparatus, Messrs. G. Clough & Co., Stockton; for donkey engine and boiler, Messrs. J. W. Lewes & Co., Middlesbrough; for stoves, kitchen-ranges, laundry fittings, J. Lear & Sons; and for laying out the ground, Mr. J. Prior. It is expected that the original contract price will be exceeded by about 400*l.* or 500*l.* for the additional works.

A new church is about to be built for St. Paul's district, and the first stone has been laid. The position chosen is a few yards further up Durham-road than where the present church stands, on the opposite side of the road. The total cost of the church, with tower and spire, is estimated at 4,100*l.* Of this about 3,350*l.* have already been raised, sufficient to meet the contract for the church, with tower and spire, but exclusive of paying for and laying out the enclosure of the land.

THE NEW OPERA-HOUSE, PARIS.

IN a former article on the French Mind we endeavoured to draw attention to the spirit of centralisation which is ever influencing the thoughts and actions of Frenchmen. We shall now try to show how the plans of French buildings are the organic outgrowths of that centralising spirit.

The new opera-house of Paris will suitably illustrate our meaning. A French playhouse postulates five requirements:—1. The Stage; 2. The Theatre Proper, comprising the pit, the boxes, the galleries, and the orchestra; 3. The Foyer or public promenade; 4. The Manager's Offices; 5. The Approaches.

The puzzle, then, for the architect of a playhouse is to find a simple system of lines which will both satisfy the demands of the five main divisions of the house and the spectator's instinct of organic unity. If the architect be happy enough to hit upon such a system of simple and continuous lines, not only will he produce a practical and beautiful structure, but its erection will be easier to carry out, and will prove more solid than otherwise, because the walls, being in one line, can, so to say, be chained together.

M. Garnier's opera-house is an oblong rectangle, with projections or annexes in the middle of its long sides. Few geometrical figures are more regular and elegant. Roughly speaking, the house is not unlike a steamer balanced by her paddle-boxes. Two galleries run the whole length of the building on each side of it. These galleries, on account of their unbroken oneness, have a logical though unobtrusive beauty, which commends itself highly to the mind of a French architect. They form, indeed, a framework to the inner building, and thus bind up its five divisions in one majestic whole; ay, they shoot past the annexes so independently that they leave the spectator's understanding quite clear as to the subsidiary relation of these annexes to the main edifice.

In the opinion of French architects, such relations of parts must be distinctly legible in the general drift of the main lines of a building. Ay, more,—the French architect is not satisfied with impressing the cursory sight-seer with the purpose of every part, but he thinks he ought to plan every part, be it ever so subordinate to the main building and independent from it, so as to make that part neatly harmonise with the building by its leading lines and its position. In order to suggest the filiation of the annexes to the building, M. Garnier placed them symmetrically to the building's major axis, raising their principal walls in the prolongation of the principal walls of the house. By this simple system of lines the annexes seem to link arms with their parent erection, and thus the feeling of constructive unity is fully gratified.

But the question will be asked by Englishmen,—Is it always practical, is it always feasible to shape a part or a main division of a building to the requirements of geometrical unity? The Frenchman replies,—Certainly not; but the division of a building, which is most privileged to an eccentric individuality, *i.e.*, to an individuality, the outcome of necessity, is the *principal division*. Now, the principal division of a playhouse is the *stage*, because the stage, without which all the other portions of a theatre are meaningless, is, even when deprived of supplementary buildings, quite sufficient for histrionic purposes. Like the stage of a Punch and Judy show, the stage of a playhouse may be said to be the all-in-all of that playhouse. So the stage in M. Garnier's opera-house, occupies the whole breadth of the building, and is thus characterised by vast size rather than by special form.

Next in dignity to the stage is the Theatre Proper, with its pit, boxes, galleries, and orchestra. It fills the middle of the building, lies symmetrically to its major and minor axes, and

LECTURE THEATRE BUILDINGS AT SOUTH KENSINGTON.

OUR illustration this week represents the façade of the new Lecture Theatre and Refreshment-rooms, which form the north side of the internal quadrangle of the Museum at South Kensington. The materials employed are mainly red brick with dressings, and enrichments of terra-cotta. The chief feature of the design is a deeply-recessed arcade on the principal floor, the arches being supported on columns of terra-cotta, modelled by the late Godfrey Sykes. The soffits of the arches are filled with white majolica, manufactured by Messrs. Minton & Co., of Stoke-upon-Trent. Figures holding shields of the same material are also introduced in the spandrels on either side of the circular panels in the arched recesses, and in the square panels above the door. The three circular panels just alluded to, are filled with glass mosaics, by Messrs. Salviati, Rust, & Simpson. The figures, which represent History, Poetry, and Alchemy, are executed in coloured tessera, upon a gold background.

The door, which forms the central feature of the lower story, is in six panels, with figures of Newton, Davy, Bramante, Michelangelo, Watt, and Titian. It may be remembered that this bronze door attracted a great deal of notice in the Paris Exhibition. It has since been richly gilt. The brickwork of the ground-floor is banded with four courses of moulded bricks, the intermediate portions being rubbed and gauged. The arch-heads of the large openings to the right and left of the central building, are filled with lunettes in mosaic-work. These mosaics were executed in the South Kensington Museum by the female students, the materials being supplied by Messrs. Minton, Hollins, & Co. The rectangular panels in the upper portions of the wings, and the large picture which occupies the tympanum of the pediment, were carried out in the same way. The upper story of the theatre building consists of a series of triple arches placed in square-headed recesses, the spandrels above the arches being filled with a diaper of red terra-cotta. The subject of the design in the pediment is the Exhibition of 1851. Four allegorical figures, representing the four quarters of the globe, receive from Queen Victoria wreaths and rewards, while natives of the different countries bring their manufactures and produce to the Exhibition. In the background is the building. The figures are executed in buff tissue, the Exhibition being black, and the groundwork of the whole gold. On the pedestals at the corners of the building will be colossal groups in terra-cotta, designed by Mr. Bale, a student of the Lambeth School of Art. One of these figures, manufactured by Messrs. Doulton, is already on the ground. The summit of the roof is surrounded by a perforated screen of cast iron, supplied by Messrs. Hart & Son. The terra-cotta for the buildings was furnished by Blanchard, of Blackfriars-road, with the exception of the frames of the square panels, which were made by Millichamp, of Lambeth. Mr. Cawte, of Fareham, supplied the bricks; Messrs. Smith & Taylor were the builders; and, since the death of Captain Fowke, Lieut.-Col. Scott, R.E., has been the Director of Works.

ARCHITECTS' RIGHTS AND CHARGES.

THE DRAWINGS OF THE HOUSES OF PARLIAMENT.

SIR,—Mr. E. M. Barry's case is likely to go round the artistic world as one of extreme hardship to Mr. Barry himself, and of reproach to be hereafter attached to Mr. Ayrton's name. It is a constant and, in principle, a reasonable claim set forth by political rulers that they should be allowed to complete their measures before they are judged and turned out. Why not adhere to the same rule with regard to artistical works and men? We, in Canada, had a case of a similar nature to that of Mr. Barry, in the matter of the Ottawa Government Departmental Buildings. But the works had then so far progressed as not to suffer much by a change of architects; and this satisfaction was offered the profession in Canada, that a *sacrifice* was necessary! However, the architects, who were employed under commission, were not asked for any more drawings and details than had already been executed at the actual stage of the works. Would the lordly British Government be less magnanimous than a Colonial?

Englishmen should certainly look to it as a blessing that the chain of tradition was not broken until the present day in the building of the Houses of Parliament, the son succeeding the father in the carrying out of the works—a boon which was not always offered by Providence in many other national piles which, as artists have often an occasion to regret, lack unity of conception and execution, causing sometimes a puzzle to the archæologist and a sore to the connoisseur.

If we approach the question of economy which might have actuated Mr. Ayrton, we have here, by induction, another example of people ruining themselves through avarice. Artists will not grow on poor feed; and where is the man of talent who, in this age, would consent to seal his fate by condemning himself to drawing on the board, and selling his productions as articles of commerce?

I herewith inclose a copy of the schedule of charges, &c., followed by architects practising in Montreal, and, I may say, through the whole Dominion. It will go as another piece of evidence that any one entering our profession is made aware of his liabilities, and is expected to meet a certain treatment as a reward for his studies and labour, neither more nor less.

We, on this side of the Atlantic, earnestly hope that the Barry embroglio will be so adjusted as to accord with the rules universally adopted by the profession in England, Germany, France, and America.

Professional Charges of Architects practising in Montreal.

	Per Cent.
1. Public buildings and private residences, commission on the cost thereof of	5
2. Block of two houses of similar design, commission on the cost thereof of	4
3. Block of three, four, or five houses of similar design, commission on the cost thereof of	3
4. Block of six or more houses of similar design, commission on the cost thereof of	2½
5. Stores and warehouses, commission on the cost thereof of	4
6. Block of two stores or warehouses of similar design, commission on the cost thereof of	3
7. Block of three or more stores or warehouses of similar design, commission on the cost thereof of	2½
8. Items of charge comprised in 5 per cent. commission:—Preliminary sketches, working drawings and specifications sufficient for an estimate or contract	2½
Detailed drawings	1
General superintendence (exclusive of clerk of the works), examining and passing the accounts, exclusive of measuring and making out extras and omissions	1½
9. N.B.—The foregoing subdivision of charges to apply proportionately to stores, warehouses, &c.	
10. For works in alteration of premises, the remuneration to be increased according to the time, skill, and trouble involved.	
11. Taking out quantities from plans for a detailed estimate, commission on the amount thereof of	1¼
12. Measuring and valuing artificers' work done for any amount under 1,000 dollars	2
Over 1,000 dols. and under 4,000 dols.	1½
Over 4,000 dollars	1¼
13. For services by time at per day	10 dols.
14. N.B.—All travelling expenses to be charged extra.	
15. No charge to be made for a rough estimate obtained by cubing out the contents. If a detailed estimate be requested by the proprietor, a charge therefor is to be made as above.	
16. An architect is bound, under the full percentage charge, to provide one set of drawings and one set of tracings, with duplicate specifications; it being understood that the architect is paid for the use only of the drawings and specifications, and that these, in the event of carrying out the works to completion, are to remain his property.	

The above was agreed on in February, 1865, and from the last clause (16th) it will be seen that Mr. Ayrton's claims as to the ownership of the drawings of the English Houses of Parliament would, in Canada, be resisted by the architect.

A. LÉVÊQUE.

Montreal.

THE COLUMNS IN ST. SWITHIN'S, LINCOLN.

SIR,—I will not attempt to follow the quotation from the *Lincoln Gazette*, which appeared in your last issue, but simply give you a few facts. The pillars of the nave arcades are of Ancaster stone, 2 ft. diameter, of alternately circular and octagonal section, containing an area in the circular ones, the smallest, of 453·009 in. The weight of the clearstory and roof on each pillar I estimate at 60 tons, or 2·649 cwt. per inch of area. Mr. Huddlestone, a local builder of some considerable experience, and a member of the committee, states that there are about 40 tons of walling on each on the north side, and 38 tons on the south side. To this must be added the weight of the roof,—not 20 tons per pillar, certainly,—so that my estimate is in excess of his. Now, if published tests of the quality of stone are worth anything, and it is upon these only that architects can depend in calculating for weights, &c., I give you the following:—In the experiments made by Messrs. Poole & Son, in October, 1864, on Bath stone, it was shown that a weight of about 80 tons might be considered safe per foot, some not showing damage until upwards of 120 tons per foot. The report of the Royal Commission states the cohesive power of Bath (Box) stone at 5·313 cwt., and of Ancaster at 8·349 cwt.; and if Bath will carry 80 tons, Ancaster should carry 128 tons; or these pillars, of 3¼ ft. area, should carry 405 tons; and a stone of which the cohesive,—not the crushing,—power is 8.349 cwt., ought not to crush with a weight of 2·649 cwt.

In some experiments made by Messrs. Poole, also, on Ancaster stone, the crushing weight for these columns would be 391 tons, 12 cwt. 16 lb.

In some made by Mr. Lindley, the owner of the Mansfield Quarries, the crushing weight of Ancaster stone is given as 18·33 cwt. per inch, or about seven times the weight on each of these pillars, viz., 415 tons.

JAS. FOWLER.

WATERING STREETS.

YOUR correspondent who inquires a better way of watering streets than by horse and cart, such as hose and jet, &c., will find the information he requires in some recent numbers of the *Gardeners' Chronicle*. It is there stated that the Local Board of Health of Reading has used the hose and wheel apparatus for many years, and is quite satisfied with its working. Those in use there are larger than those used in Paris, but are similar in other respects. A somewhat similar plan was followed in Oxford fourteen or fifteen years ago. It is very cheap; and the simplest form is gas-piping in 12-ft. lengths, put upon small cast-iron wheels, and united by india-rubber hose. Messrs. C. Hart & Sons, of 13, Gun-street, Reading, would give any further information.

S.

DESTRUCTION OF A MASTERPIECE OF ART.

MOST of our readers will remember the richly-mounted and jewelled human skull, taken from the summer palace of the Emperor of China, and exhibited, under the department of Goldsmith's Work and Jewelry, in the Chinese Court of the Great Exhibition of 1862. It was then in the possession of Mr. P. M. Tait, and the price put upon it was one thousand guineas. It stood upon a triangular stand of pure gold, resting on three roughly-shaped heads of solid gold. The cover was also of pure gold, richly ornamented with minute patterns in low relief, and studded with small precious stones.* Good judges have spoken of it as the most remarkable specimen of Oriental goldsmith's work ever seen. This extraordinary piece of work has now been *melted down* for the mere value of the metal, and thus one of the most precious relics of Chinese art and history is irretrievably lost. Nothing remains but the upper part of the naked skull (which has been supposed to be that of Confucius!), and which was left uncared for at the house of a Jewish gold-dealer in *Houndsditch!*

THE KENSINGTON ROAD.

SIR,—"Quondam," in his communication to you of last week, says that the slip proposed to be taken from Hyde Park, is in length 500 yards, by a width of 25 yards. He is wrong in the last measure; it should be feet, not yards, and it is only 25 feet in one small part of the length. The average width is very much less: 75 ft. would cause the lodge, just erected, in front of the Exhibition-road, and that at Queen's Gate, together with the iron gates and rails there to be removed. The erection at Queen's Gate cost the builder on the Harrington and Alexandra estate nearly 3,000*l*. The line proposed, however, passes in front of them. The trees might be preserved according to "Quondam's" idea, by putting the road-path within them. It would almost do everything that was required, to give a good approach to the Hall of Science.

A mistake is made by parties who propose that the statue of the Prince Consort, in the monument, should be turned with its face to the park, in order that it might be towards the site of the Exhibition of 1851. It would be nothing of the kind. The first glass palace stood far away towards Hyde Park-corner; and the statue, if placed in the position proposed, would front towards what has always been vacant land, and have its back to the real valuable creation of the revered Prince Consort, the splendid Museum of Arts and Science, the Hall of Science, and the other buildings devoted to a national purpose, that will undoubtedly in a few years be erected there.

C. J. R.

* Readers will find it figured in Mr. Waring's "Masterpieces of Industrial Art," vol. iii., p. 291.

PIRATING A ROTHERHAM FIRM'S DESIGN.

A CASE of some importance has come before the borough justices at Wakefield. Mr. Samuel Nichol, iron founder, Vicarage-street, Wakefield, was charged with infringing a new, original, and patent design for an oven-door, the property of Messrs. Hattersley Brothers & Co., iron-founders, Queen's Foundry, Swinton, near Rotherham. An agent to the prosecutor gave evidence as to the purchase of stoves, with an oven-door, identical with the prosecutor's in form. In his opinion the door had been cast from the prosecutor's casting. The prosecutor's trade-mark, however, did not appear upon the defendant's door. The defendant's son was then called, and he said that since they got the summons they had destroyed all their models, which corresponded with those belonging to the prosecutors. Other evidence having been given, the Bench fined the defendant 5*l.*, and ordered him to pay the costs, which amounted to 2*l.* 10s. Mr. Wainwright said he had received instructions to prosecute all offenders.

"AN ARCHITECT'S BILL."

LINCOLNSHIRE AND NOTTINGHAMSHIRE UNION SCHOOLS.

SIR,—Neither Mr. Peck nor his solicitors have mended matters by publishing an explanation of this bill. The main facts, as described in your Journal, remain uncontradicted; but as Messrs. Monckton & Co. have given the particulars, it enables even a countryman to criticise it. The first item is—Commission on 13,300*l.*, being estimate of expenditure, 666*l.* 10s. There are only two errors in these figures, viz., the estimate procured for carrying out the works amounted to 12,340*l.*, and upon this actual sum (not an assumed estimate of the architects), is the commission payable; and as the works were not carried out, Mr. Peck neither superintended the works nor made out any builders' accounts, and therefore, by the rules of the Institute of British Architects, and the invariable practice of architects in London, and even in the country, he is only entitled to charge 3 per cent., instead of 5 per cent., or 370*l.*, instead of 666*l.* 10s.,—a difference of only 296*l.* 10s.

A BUMPKIN.

*** The correspondence must end here.—ED.

CURIOUS COINCIDENCES FOR OBSERVATION.

SIR,—When I ventured to point out in the *Builder** the expediency of making simultaneous observations upon the physical changes in a systematic form, I anticipated a record of magnetical and electrical effects, or their dynamic manifestations, from different expert scientific observers, so far as related to mundane interests in the various parts of the world, up to this time. However, in a relatively local point of view,—that is to say, in this country, the climate, or weather, during the past three months has been remarkable; and farmers and others who are interested in the climate observe the indications of the very small quantity of rain which has fallen of late, and for which no provision could be made by man to supply artificially.

Now, as I venture to anticipate that the compensation for the deficiency of rain will be, perhaps, suddenly made up, we may expect a kind of tropical supply of water in an inconveniently short space of time, so as to overtax the usual outlets and overflow the drains and sewers. The storm outfalls ought to be looked after at once. The sudden change will be sure to be attended with magnificent electrical phenomena, and impress its effects upon various objects: lightning conductors will be found quite the right thing just now as a salutary provision, if properly conducted into water.

With the exception of the physical commotion which took place on the 18th of March last, at Natal, South Africa, very few records of electrical or magnetic storms have been published.

It takes time to accumulate effects before the results reach the senses, and then mostly in a form to which we are accustomed and at once identify by a popular name.

I still urge the critical examination of the magnetic indications, with the ultimate view to trace the influence of the magnetism of the sun upon the inclination of the axis of the earth to the plane of its orbit, and the consequent influence upon climate during ages, and the simultaneous development *by selection* of various organised beings, adapted to such period, and fully identified by geologists.

ARTHUR GRABING.

ELECTRICITY IN THE DRAWING-ROOM.

A FRENCH story is told in a London journal, to the effect that the Empress of the French (it would seem to be) had received an electric shock on going to a mantelpiece before which lay a bear-skin on the floor; and that when the Emperor did so, "a fine jet of bluish fire was seen to pass from the marble to his clothes." The story, we confess, looks rather apocryphal in the way it is put; but it reminds us that in some recent electric experiments, Sir C. Wheatstone has ascertained that the mere shuffling of the feet along a carpet will charge the human body with electricity sufficient to indicate itself by means of a delicate electrometer which he used; nay, that the electric charge resulting from a single stamp of a foot is thus recognisable. And this gives some countenance to the strange story from America, that not only do people thus charge themselves electrically, for private amusement, but that they can set fire to gas with the tips of the fingers when so charged. In America, at all events, it is well known that electricity occasionally manifests itself far more strongly than with us; and this has been attributed to the moisture of our climate on the one hand, and the dryness of the American on the other. Perhaps the continental extent of the ground in America, has something also to do with the state of electricity there; and, it may be, with the gradual and peculiar change in the physical characteristics of the people, as originally immigrants mainly from this country.

* See p. 231, *ante*.

GRANTHAM NEW TOWNHALL.

THE new building consists of a porch, spacious entrance-hall, 30 ft. by 19 ft. 6 in.; on the left hand of which is a subscription news-room, 30 ft. by 19 ft. 6 in., with a W.C. and lavatory adjoining; and on the right hand is the borough surveyor's office and muniment-room, behind which is the townhall kitchen. Immediately behind the entrance-hall and staircase is placed the sessions hall, which is 50 ft. by 30 ft. and 26 ft. high. This hall is fitted up with ornamental pierced panelled work, having a raised dais or platform at one end for the magistrates, the centre of which is occupied with a canopy-headed seat for the mayor. Behind this platform is the private entrance for the magistrates, and a private retiring-room, W.C., and lavatory, and also a petty jury retiring-room; the latter is approached from a separate entrance almost immediately from the jury-box. The arrangements for the grand jury, clerk of the peace, the pleaders, witnesses, prisoners, and the public in this hall, appear to have given great satisfaction. On the right hand of the main building, and abutting against it, is placed the borough police station, which consists of the superintendent's residence and four police cells, fitted up with every convenience, and warmed by means of hot water.

The residence of the superintendent, in whose care the buildings are entrusted, has direct communication with the townhall proper.

The prison is placed immediately behind the sessions-hall, and consists of twenty-four cells eighteen of which are for males, and the remainder for females. The governor's residence is placed at one end of the prison.

The upper floor of the townhall is approached from the entrance-hall by a spacious staircase, 6 ft. 6 in. wide, the height of which is divided into three flights, having spacious landings between each. From the second landing, right and left, are placed the grand jury-room and witness-in-waiting-room. From the former a door leads directly into the grand jury-gallery of the sessions-hall. These rooms are also intended to be used as retiring-rooms to the large assembly-room when required.

The assembly-room occupies the entire front of the main building, is 60 ft. by 30 ft., and 21 ft. high, and is capable of dining with comfort about 200 persons. The ceiling of this room is divided into nine panels, three in length and three in width, the beams dividing them being left perfectly plain, thus giving apparent strength to the constructive features of the ceiling. Ornamental cornices are fixed round the inside of each panel, that portion of it on the ceiling being pierced through for ventilation. The decorations consist of carved plaster work in the Renaissance style of architecture.

The front buildings next St. Peter's-hill are built with Messrs. Platt's patent dry-pressed red bricks, from Oldham, in Lancashire, with Ancaster stone dressings, except the columns of the front entrance porch, which are of red Mansfield stone. The stone arches to the windows, and the archways of the porch, have moulded panels inlaid with Lizard serpentine polished marble. The entrance-hall floor is laid with Maw & Co.'s encaustic tiles.

The cost of the prison and governor's residence was nearly 3,000*l.*; and when we consider that there are in addition thereto separate houses for the chief warder, superintendent of police, and four cottages for policemen, making no less than seven separate houses, likewise police-station, offices for fire-brigade, and sessions hall, it will be seen that from a little over 8,000*l.* a very small sum could have remained for the town-hall proper.

Mr. W. Watkins, of Lincoln, was the architect; and Mr. Wartnaby, of Grantham, the contractor.

The India Museum.—In future this museum will be opened on Saturdays until eight o'clock p.m.

CHURCH-BUILDING NEWS.

Tonge.—St. Michael's Church, Tonge, has been renovated in its internal fittings and arrangements, from the designs and under the superintendence of Mr. H. Cockbain, architect, Middleton, near Manchester. The old high-backed pews have been removed, and open benches substituted, with reclining seats and backs, and the walls of the nave have been wainscoted with portions of the old woodwork. The arrangement of the chancel and choir has been materially altered. A portion of the nave floor in front of the chancel has been raised two steps, and will accommodate the clergy and choristers. Above this, the floor of the chancel has been raised three steps. The walls and ceiling of the chancel have been painted and decorated with bands, powdering, diaper, and other designs in colours. These decorations have been executed gratuitously by Mr. John Deane. The wainscot on the east wall of the chancel is, like the other woodwork, of pitch-pine. Other alterations and improvements have been effected. The contractors were Messrs. Welling, Brothers, of Middleton. The ironwork was by Messrs Thomason & Co., of Birmingham and Manchester.

Thorndon.—The Church of Thorndon, near Eye, is about to be restored. The work contemplated includes refacing the walls, the removal of the old carved pulpit and reading-desk nearer the chancel, rebenching the nave, the removal of the gallery, and throwing open the west window, now for the most part blocked up by it. By lengthening the benches, narrowing the passage, and seating that part under the present gallery, the number of sittings will be increased and the interior of the church improved. The walls are continued from end to end without a break, the chancel being only distinguished from the rest of the church by the steps which lead to it, and in the roof by a projecting rib springing from carved corbels. Mr. Paipson is the architect employed, and Mr. Grimwood, of Weybread, the contractor. The contract is for 377*l.*

Cheadle.—The chancel of the parish church of Caverswall, which is interesting as containing some curious inscriptions on mural monuments, and also Chantrey's monument to the late Countess of St. Vincent, has been restored at the expense of the patron of the benefice, the Hon. E. S. Parker Jervis. The work has been carried out by Mr. S. Mear, of Longton, builder. Everything has been done without the aid of an architect.

Oundle.—Bulwick Church, Northamptonshire, is undergoing a necessary restoration. The edifice has been placed in the hands of Messrs. Slater & Carpenter, of London, architects, and Messrs. Halliday & Cave, of Greetham, Rutland, contractors. The provisions made for carrying out the restoration have been agreed upon, Mr. T. Tyron, the lord of the manor, offering to heat the church and erect the family seats; the other portion of the expense to be borne by the incumbent, and a rate leviable on the parish.

Great Waltham.—The foundation-stone of a new church has been laid at Forth-end, near Great Waltham, by Mrs. Tufnell, of Langley's Park. The district assigned to it is the northern portion of the large and scattered parish of Great Waltham. An eligible site of four acres for the church and for a parsonage-house, which is also to be erected, has been given by Mr. J. J. Tufnell, who has likewise contributed towards the building of the fabric and the residence. The new church, which is to be dedicated to St. John the Evangelist, will be built in accordance with plans which have been prepared by Mr. Chancellor, of Chelmsford. It will consist of a nave of about 60 ft. long by 22 ft., a south aisle the same length and about 10 ft. wide, and a chancel with octagonal end 27 ft. 6 in. long by 19 ft. wide, providing accommodation in all for about 285 persons. At the east end of the aisle there will be a tower, the ground floor of which will serve as a vestry, and the south doorway of the aisle will be protected by a porch. The walls of the building throughout will be faced with red bricks, inside and outside, relieved by bands of pressed bricks and stone. The windows in every part of the church will have moulded brick jambs and arches with plate tracery. The arcade separating the aisle from the nave will have stone columns with moulded brick arches. The roofs of the nave and aisle will be open timbered. The tower will be 50 ft. in height from nave floor to eave of spire, and the spire will be 20 ft. high. The porch will be of oak,

open timbered with arcaded sides. The church will be fitted internally with open benches, and the gangways will be paved with tiles. It is proposed to heat the church with hot water. The cost of the building will amount to something like 2,550*l*.

Southborough.—The foundation-stone of a new church has been laid on the New Building Ground, Southborough. The funds at present will only admit of a portion of the church being built. There will be a chancel and two transepts, and the church will be built in the early Gothic style, of local stone, with Bath stone dressings. It will be lined internally with red bricks, and will have an open-timbered roof covered with tiles. The church is to hold about 300 people, and is to be completed, at a cost of about 1,800*l*., by Messrs. Willicombe & Oakley, the architect being Mr. Theodore H. Green.

Preston (*Lancashire*). — Emmanuel Church, Preston, has been consecrated by the Bishop of Manchester. It is built of brick, with strings and bands of coloured and moulded bricks and stone dressings. The style of architecture is Geometrical Gothic. The plan is cruciform, and the ground floor accommodates 632 adults, 150 in the west gallery, and 92 in each transept gallery. There are four entrances to the church, viz., the tower doorway, the double doorways at the west end, and one to each transept which answers for the galleries. The entrances are so arranged by double doors that everything in the shape of draught is obviated. The west entrance is approached by a porch projecting about 7 ft., which is surmounted by an ornamental carved stone cornice, and a neat balcony with trefoil and quatrefoil perforations having large carved leaves at the angles. Over the archway in front of each door is a gablet, with panels underneath left for carving some appropriate subject. The organ-chamber and vestry are on the south side, on the north side of the chancel. The tower of the church is at the south-west corner: it is 12 ft. square inside. The nave is lighted by two and three light windows on the north and south sides, filled with plate tracery. The transepts are lighted on the west by two single lights, and at the ends with three single lights, having a large one over. The chancel has a five-light, and the west end of the nave a four-light. The roofs throughout are open timber of pitch pine, and are boarded diagonally. The extreme length from east to west is 125 ft.; breadth over transepts, 86 ft.; breadth of nave, 40 ft.; chancel, 20 ft.; transepts, 25 ft. 6 in.; length of nave, including vestibule, 86 ft. 6 in.; chancel, 27 ft.; organ-chamber, 13 ft. by 11 ft.; height of nave from floor to ridge, 45 ft.; height of tower to top of pinnacles, 100 ft. The architects of the edifice, its furniture, and fittings, were Messrs. Myres, Veevers, & Myres, of Preston. Mr. John Pownall was clerk of works; and Mr. John Bamber, builder. The gasfittings and lectern were provided by Mr. John Whitehead; heating apparatus by Mr. Seward; and the decorations by Messrs. Park & Co., all of this town.

Keele, Staffordshire.—The new Church of St. John the Baptist, built at the sole cost of Mr. Ralph Sneyd, of Keele Hall, the patron of the living and owner of the parish, has been opened for divine service. The church has been erected from the designs of Mr. T. Lewis, of Newcastle, architect, under whose superintendence the works have been carried out to completion. The rebuilding was commenced in the spring of 1868. The new edifice will seat 280 adults and 100 children, and consists of a chancel, 32 ft. by 18 ft., with a vestry on the north side thereof; chancel aisles, each 12 ft. 6 in. by 12 ft. 6 in.; nave, 60 ft. by 21 ft.; north and south aisles, each 47 ft. by 10 ft.; and a tower, 16 ft. square at the west end of the south aisle, with a spire, the total height of which is 128 ft. from the ground level to the top of the metal finial. The principal entrances are by porches at the west end and on the south side. The building is of the Decorated period of Gothic architecture. The external walls are 2 ft. 3 in. thick, built with rock-faced native stone (of a pale red colour), and Hollington stone dressings outside; and inside the walls are lined with Weston stone, part of which formed the outside walling of the old church, the piers, arches, and general dressings being of Hollington stone. The nave has an arcading of four arches on each side, with octagonal piers supporting a clear-story, and with a moulded arch between the nave and chancel, with smaller arches to the chancel aisles. In the course of the excavations for the foundations, two recumbent figures in alabaster were found. These were recognised as having formed the effigies from an altar tomb, which had been in the former church as a monument of the Sneyd family. These and the tomb have been restored, and placed in a recess prepared for them on the north side of the chancel. Against the east wall of the chancel is an arcaded reredos formed of Hollington stone, with columns of griotti marble and panels of Minton's mosaic tiles; the floor of the chancel and altar platform are laid with Minton's tiles. The font is of Hollington stone, the upper part having carved panels and appropriate inscription, and supported by an octagonal base with griotti marble columns. The roofs are of high pitch, and covered with green Westmoreland slates, those of the nave and aisles being of red deal, stained, and the plaster between the rafters tinted blue. The chancel and chancel aisle roofs are panelled in oak, and the main ribs of the former are supported by carved oak figures supporting shields. All the seats, pulpit, desk, communion-table, and other fittings are in oak. All the windows are glazed with cathedral glass, having a narrow border of clear glass round each light; the glass in the east and west windows is only common glass at present, but is intended shortly to be replaced with stained glass. The church is warmed by Haden & Son, of Trowbridge. The six bells, which were formerly in the old tower, have been tuned, refitted, and rehung in the new tower, by Messrs. Mears & Stainbank, of London, and were rung at the opening services. One of these bells has the inscription, "God save the King, 1647," cast upon it.

DISSENTING CHURCH BUILDING NEWS.

Derby. — The new Congregational chapel, Derwent-street, has been opened. It is planned to seat 350 persons, and is of sufficient height to admit of the addition of side galleries, for the insertion of which and the extension of the end gallery provision is made. By these means the accommodation may be increased to 500. An organ-gallery occupies a recess behind the pulpit, and beneath is a vestry. The site provides ample room for commodious schools, which it is proposed to erect at a future time. The style of architecture adopted is Gothic of the fourteenth century. The front next Derwent-street has a four-light traceried window in the centre gable, and an arched doorway underneath, the arch being moulded and supported on stone shafts with carved capitals. Staircase wings flank the front gable on either side, that on the south side being grouped with an octagon spirelet, 60 ft. high. The work has been executed by Mr. Stoddard, of Derby, the contract price being 1,258*l*. Mr. Tait, of Leicester, is the architect.——The Green-hill Wesleyan Chapel has been re-opened after undergoing extensive alterations. The ceiling has been raised and thrown into moulded panels; the windows, of which there are six on each side, are new; the square windows in the gallery are superseded by circular headed ones. New vestries have been added, the roof has been re-slated, and the old front has been replaced by an elevation in the Italian style. Mr. John Gadsby has carried out the work. The late Mr. Woolhouse was the contractor for the plumbing. The decorations were by Mr. Basford. The alterations and improvements have been made under the superintendence of Messrs. Giles & Brookhouse, architects. The cost of the improvements will be something like 1,000*l*.

Cambridge.—The memorial stone of a new Wesleyan chapel has been laid in Hills-road, Cambridge. The chapel and minister's house are to cost 4,600*l*., and the funds still needed to complete the work are 2,000*l*. The chapel is first being proceeded with. The design is Early Gothic. The chapel is set back some 20 yards from the road. In the basement there are arranged a schoolroom, 42 ft. by 33 ft., three class-rooms, of good sizes, kitchen and heating-apparatus room. On the ground-floor plan there will be inner and outer lobbies to the chapel. The sittings on the ground-floor will accommodate 340; those in the gallery will accommodate 200 adults and 100 children, and the organ-gallery 10 adults. The gallery will be approached from both sides of the principal entrance by means of a staircase. At the back of the chapel, over the kitchen, will be a minister's vestry. On the left-hand of the principal entrance will rise an octagonal bell-turret, relieved at the top by an open octagonal canopy, the arrises of which are somewhat obliterated with carving and gurgoyles. The front gable is pierced by a triplet window, filled in with Geometrical tracery, having four lights in the centre and two at the sides. The whole of the windows in the chapel will be glazed with cathedral glass in quarry lights. The principal entrance doorway is in the centre of the front. At the sides of the entrance doorway are double-lighted windows for the inner lobbies. There are main entrances at the front and side to the staircase wings of the gallery. The building will be constructed of white bricks and Bath stone dressings. The amount of the contract is 2,938*l*. The architects are Messrs. Hill & Swann, of Leeds and Sheffield; the builder and contractor, Mr. Thoday, of Cambridge; and the clerk of the works, Mr. W. Cooper.

SCHOOL-BUILDING NEWS.

Abingdon.—The new Grammar School here has been opened. The site is in the Albert Park. The new buildings have been erected by Mr. Charles Claridge, of Banbury, the contractor. On the ground floor, so called, which, however, in this case is elevated some 9 ft. above the ground, in order to give an airy basement-story underneath, there are a schoolroom (66 ft. by 20 ft.), having an open-timbered roof; boys' library, class-rooms, dining-hall, and assistant master's sitting-rooms. The first and second floors are devoted to dormitories for forty boys, bath-room, masters' bedrooms, matron's rooms, and other offices. Underneath the schoolroom is a covered playground for the use of the boys in wet weather, the side walls being arched, the floors laid with coloured tiles, and entered from the outside. The infirmaries or sick rooms are detached from the other portions of the building, being approached by a separate staircase, which can only be entered from one of the matron's rooms. The dining-hall is fitted up with dinner-lift oak tables and benches. The master's house, is of ample dimensions, some of the rooms being much beyond the usual size, the drawing-room having an oriel window on that side which overlooks the park. Externally the building is of a simple character, the local material of red brick and tile being the chief material employed, relieved by bands of Bath stone, the windows also being of that material. The grounds surrounding the building are being levelled and laid out as playground, recreation or pleasure grounds, and gardens for the head-master. Boundary-walls, gates, and fences are being erected in accordance with the design of the building by the trustees. The designs for the building were selected in competition, and were prepared by Mr. Edwin Dolby, of Abingdon, who has also superintended the works, assisted by his clerk of the works, Mr. R. F. Bryan. The total cost of the buildings, fittings, architect's commission, clerk of works' salary, and all other expenses, will be about 7,000*l*. The stone carving has all been executed by Mr. Samuel Grafton, of Oxford.

Devonport.—The new schools at St. Stephen's, Devonport, have been opened. The site has been given by Sir Edward St. Aubyn, the lord of the manor, and the architect was Mr. J. P. St. Aubyn, London. The builder was Mr. Elliott, of Plymouth. The schools will accommodate over five hundred children. The front does not come out level with the houses, but retreats several yards, and is enclosed with rails. The cost of the new schools is 1,400*l*.

Oldham.—St. Peter's Branch Schools, Ashton-road, have been opened as a place for the celebration of divine service on Sunday, and "as an easement to St. Peter's Church." The building is in the Gothic style, with open-timbered roof and two light windows with pointed heads. It has a spirelet, containing a bell, upon the apex of the gable. There is a porch to the principal entrance, and a small chancel, with vestry attached, having a cellar underneath, containing boiler for tea parties, &c. The building will seat about 280 persons. It is heated by hot air, and lighted by ornamental wall brackets. The total cost, including fittings and boundary wall, will be about 800*l*. Mr. John Wild, of Oldham, is the architect; and Mr. Wm. Lees, of Greenacres-hill, the contractor for the whole of the works.

Stamford.—Roman Catholic schools have been erected here. The new building is of stone, and in a style of architecture corresponding with that of the church, *i.e.*, Early Geometrical Pointed. It is 46 ft. long by 20 ft. wide, and 25 ft. high inside. The room is entered by a porch to the front, and opposite to that of the church, being lighted by a characteristic pointed

window in its gable. The floor is laid with tiles. The windows are coupled, pointed-headed, with an inner arch stopping in against splayed jambs; the lower portion of the woodwork being fixed, and that above the stone transome levels hinged to fall inwards. A traceried, cusped, pointed, and wheeled window fills the gables. The roof is composed of framed principals and curved pieces, carrying chamfered purlins, closer together than generally seen; and these in their turn carry the hoarding which is exposed. Messrs. Goldie & Child, of London, were the architects, under whose superintendence and from whose designs the work was carried out. Messrs. Halliday & Cave, of Greetham, were the contractors, whose foreman, Mr. Walters, had charge of the work.

Thorpe-le-Soken.—The memorial stone of a new parochial school has been laid here. The site of the proposed school, about three-quarters of an acre, is in the centre of the village, near to the church, and is the gift of the vicar. Mr. James Rolph, of Thorpe Park, has offered to be at the whole expense of erecting the schools, the estimated cost of which is between 700*l.* and 800*l.* The architect is Mr. White, of London, and the work has been undertaken by Messrs. Gifford & Wellham, of Thorpe, builders.

VILLA AND HOTEL BUILDING.

Carshalton.—The laying of a memorial stone in the walls of the first villa erected by Mr. E. H. Rabbits, on his Strawberry Farm Estate, has recently taken place. Strawberry Farm lies to the north of the new line of railway, the railway embankment bounding the estate on one side, from the bridge over North-street to a second bridge over the road and the river close to the residence of Mr. G. Brodrick, which forms part of the property. The other sides of the estate present frontages to three roads, one of which skirts Hackbridge Park. The whole is well timbered. The gravelly soil, the close proximity to the railway station, the rural and proverbially healthy nature of the locality, and the attraction of the Wandle, combine to recommend the spot as a site desirable for country villa residences. It is arranged to have but one road through the estate, which, with drains, are being formed and made. First-class houses are to be erected, with from a half to an acre of ground each. The ground is to be let or sold, and houses will be built to the design of those agreeing to take them after completion. The architect is Mr J. D. Hayton.

Southampton.—An addition to the hotel accommodation at this busy port has been inaugurated by the opening of a building in the Italian style of architecture, which forms a façade to the terminus of the South-Western Railway, and immediately faces the docks from which the mail steamers start. This hotel has more than 100 bedrooms, with reception-rooms, bath-rooms, &c. It is started upon the somewhat indefinite but very requisite principle of a "fixed and moderate" tariff. A feature is a steam laundry of capacity sufficient to start any number of the longest *voyageurs* on their inland journey with clean wardrobes in a few hours.

STAINED GLASS.

Christ Church, North Shields.—The great west window of the tower in this church has just been filled with stained glass, to the memory of the late Rev. Christopher Reed, M.A., thirty-eight years vicar of Tynemouth. The window is circular, 10 ft. in diameter, and is fixed in iron-work with copper fittings. The subject is "Our Lord's Commission to the Apostles," which is surrounded by a border, the figures of our Lord, St. Peter, St. John, and St. James being prominent in the foreground, and life size. The work is painted with due regard to the great height in which it is placed. The cost has been raised by public subscriptions, amounting to above 110*l.*, from the parishioners of Tynemouth; and the work was designed and executed by Mr. Baguley, of Newcastle. The same artist has received a commission to paint two other windows for the same church, which will then be entirely filled with stained glass.

Chichester Cathedral.—Another memorial window, of stained glass, has been completed, and placed in the north aisle of this cathedral, immediately adjoining the north transept entrance. It was executed by Messrs. Clayton & Bell. The window is in memory of George Croke Rowden, D.C.L., Precentor of the Cathedral. The centre figure represents King David, the "sweet singer of Israel."

St. Saviour's, Lower Walmer, &c.—The east window of this church has been fitted up with stained glass, in memory of the late Mrs. Barrow. The window is in three lights, and the subjects illustrated are, in the centre, the Crucifixion, and on the sides the Bearing of the Cross and the Descent from the Cross. The tracery is filled with emblems of the Evangelists, surmounted by our Lord in majesty. Mr. W. M. Pepper, of London, fitted up the window. He is also at present engaged in restoring the stone-work and painted glass of the east window of St. Mary's, Seymour-street, and preparing nine large windows for the cathedral at Sierra Leone.

All Saints', Clifton.—A stained-glass window has been placed in the chancel of this church. It is of large size, and was designed by Powell, and executed by John Hardman, of Birmingham. It is composed of five lancet-headed compartments, and three circles above. The window represents a crowd of saints—some in heaven, and others on the earth. The cost of the window was 500*l.* A new organ has been provided for this church by Mr. Hill, of London, at a cost of 1,100*l.*

St. Catherine's, Gloucester.—At the time of the building of this church, says a Gloucester paper, five windows were placed in the chancel. They were the gift of a sister of Mr. Monk, and represented our Lord and the Evangelists. Soon afterwards a connected design for the whole of the windows was prepared by Messrs. Clayton & Bell, who suggested that in the north transept the figures should be those of Elijah, David, and Moses; in the south, those of SS. Peter, John Baptist, and Paul; in the windows on the northern side of the nave, Daniel, Ezekiel, Jeremiah, and Isaiah, prophets; in those of the south side, Stephen, Lawrence, George, Alban, Mary, and Catherine, saints of the early Christian Church; and in the window at the west end, the patriarchs Abraham, Isaac, Joseph, and Jacob. The windows in the south transept have just been erected by Messrs. Clayton & Bell; they are the gift of Mr. Charles Walker. The pierced tracery of the Catherine window has been filled with ornamental glass, the central light containing the sacred monogram. There are figures of SS. Peter, John, and Paul. In the trefoil over each is represented an angel bearing the martyr's crown and palm, and under the figures are representations of our Lord's charge to Peter, "Feed my sheep," the martyrdom of St. John in prison, and Paul struck with blindness when on his way to Damascus.

Church of Headless Cross, Redditch.—Two stained glass windows, by Mr. Preedy, of London, have been inserted in this church, to the memory of the late Baroness Windsor. In the first window there is a representation of the Holy Child, His Mother, St. Joseph, and the wondering shepherds, who have come to the stable to see Him; and underneath is the text, "The Word was made flesh, and dwelt among us." On the second light is represented the Virgin Mother holding the Child. Above their heads is the Star of Bethlehem, and kneeling in adoration are the Magi, offering their "sacred gifts of mystic meaning," while below is the text, "The kings of Tarshish and of the Isles shall bring presents." In the first light of the second window is the presentation of Christ in the Temple. On the next light is the baptism of our Lord in the Jordan; above is the holy dove, and below the text, "This is my beloved Son, in whom I am well pleased." Each of these subjects is surmounted by a canopy ornamented with golden crockets and finials, and surrounded by coloured borders. These windows are at the west end of the church.

Doncaster Church.—The Standish window, which is to be placed in the north transept of the parish church, will be from the *atelier* of Messrs. A. & W. H. O'Connor, London. The whole design will illustrate St. Matthew xvii. In the upper portion of the six lights the spiritual life will appear, depicted by the subject of the Transfiguration, shown in a mass of soft, transparent light. The figures will be of heroic size, and the whole subject will be surrounded by a great *aureola* of angelic spirits in mystic attendance. Beneath this, and also in the six lights, the subject represented will be that of the father with his lunatic and paralytic son, the disciples being grouped around—thus throwing into striking contrast, with the glory depicted above, the helplessness of humanity, struggling with pain and infirmity. The colouring of this part of the window will be toned down to a sombre light in order to contrast the more effectively with the radiance above. The *motif* is the same as Raffaelle's, but Messrs. O'Connor have designed original pictures, suited to the requirements of painted or stained glass. The cost of the window is to be 500*l.*

Wisbech Church.—A stained-glass memorial window to the late Mr. Wm. Stevens has just been placed in the north side of the chancel of this church. It is the workmanship of Messrs. Clayton & Bell, of London. The window is a two-light Gothic one, and the subject in one compartment is the "Agony in the Garden," and in the other "The Ascension." A quatrefoil above contains an angel holding a label inscribed "Watch and pray."

St. Paul and St. Peter's, Olney, Bucks.—A stained-glass memorial window is to be placed in the east end of this church. The window measures 37 ft. high, by 15 ft. wide, and contains, in the three centre compartments, the Ascension of our Lord into Glory, surrounded by the figures of the Apostles, designed life size; underneath the same, the subject of the Last Supper, forming a pedestal for the group above. In the two side openings are the subjects of the Annunciation of the Virgin Mary, the Nativity, Crucifixion, and Resurrection of Our Lord, surmounted by rich canopies in proper keeping with the figures. In the tracery are the emblems of St. Paul and St. Peter, the patron saints, also of the Four Evangelists, the Dove as an emblem of the Holy Ghost, Angels with various kinds of music, incense, &c., and others bearing scrolls. This window is now fixed. Messrs. Holland & Son, of Warwick, are the artists.

Books Received.

The Metropolitan Board of Works: Report on the Economy of Road-maintenance and Horse-draught through Steam Road-rolling, with special Reference to the Metropolis. By FREDERICK A. PAGET, C.E., &c. Printers, Judd & Glass, Doctors' Commons. 1870.

THIS Report is greatly in favour of the use of steam rollers of a certain weight. Their reputation of too great weight, Mr. Paget explains, was gained by 30-ton and 36-ton rollers. With the use of steam, he is of opinion, all objections to road-rolling fall away. There is no interruption to the traffic; the roller is easily managed, and ascends inclines; the road rapidly consolidates; no horses throw about loose metalling. The greater weight of the steam roller is its chief advantage over the horse roller. Too heavy rollers do injure the subways, &c.; but it is impossible to have a roller as heavy as the heaviest traffic. The frightening of horses can be prevented by working at night, or by blocking up the thoroughfare for a short distance while repairing the road; but an ingenious and simple way of preventing horses from being frightened by the steam-roller is to harness an old horse in front. The work of the steam-roller is much better than that of the horse-roller, in quality as well as quantity; and in economy the steam-roller is preferable. The saving in metalling can be estimated as at least 50 per cent. per annum, as is the general cost of maintenance by steam-rolling by comparison with horse-rolling.

In short, the steam-roller, in the reporter's opinion, saves expenses and time, and does better work than the horse-roller. The work diminishes the horse draught, and saves wear and tear in horse flesh, vehicles, and harness, as well as in the time and energy of men and animals.

The Report enters fully into the subject, and is very valuable.

VARIORUM.

"The Annual of Scientific Discovery; or, Year-Book of Facts in Science and Art for 1870. Edited by John Trowbridge, S.B., aided by S. Kneeland, M.D., and W. R. Nichols. Boston: Gould & Lincoln. London: Trübner & Co." This useful American Year-book of Science and Art sustains the favourable opinion of it which we have repeatedly expressed. The present volume gives a vivid portrait of Professor Peirce, and the usual notes of the editor on the progress of Science for the year 1869.——"Russian Metallurgical Works, Iron, Copper, and Gold. By Herbert Barry, late Director of the Estates and Ironworks of Vuicksa. London: Effingham Wilson. 1870." In this small volume, a plain and brief account is given of

Russian metallurgical works, at the conclusion of which the author says,—

"I think the facts I have given will show that the territory which Russia possesses, susceptible of mineralogical enterprise, is enormous; that that country is as yet developed in an infinitesimal proportion only of its real power; and that it is only awaiting energy and enterprise to make its production astound the world."

——"Handbook of English Coins. By Llewellynn Jewitt. London: Tegg." A concise description is given in this little volume of the various denominations of English coin from the Norman Conquest to the present reign. It is illustrated by metal-coloured plates of a good many of the coins described.——Hogg's "Secret Code for Letters or Telegrams. Hogg & Co., Fleet-street." To prevent the easy decipherment of secret correspondence, based on the interchange of alphabetical letters, this card has been published, with instructions for the introduction of key-words, which will sadly puzzle the would-be decipherers, and render all their attempts, on the old principles, useless, unless they can guess the key word, which may be any single word whatever, so as it be known to the correspondents beforehand.

Miscellanea.

The Public Baths and Washhouses, King-street, Camden Town.—The annual report of the commissioners for these baths to the Vestry of St. Pancras has been printed. It states that the progress made the first year the institution was opened has been fully maintained during the past year. The total receipts for the year amounted to 2,552*l.* 11s. 9d., against 2,234*l.* 1s. 6d. for the forty-four weeks the baths were opened, 1868-9. From the opening of the establishment on the 19th May, 1868, to the 20th March, 1869, 145,735 bathers availed themselves of its advantages; and for the year ending the 19th March, 1870, 149,474 persons have enjoyed the luxury of a bath. The classification is as follows:—First class, 48,364; second class, 101,110. The number of washers in the wash-houses has gradually increased, and this portion of the establishment has been very beneficial to many poor families. In 1869 payment was made on 9,425 occasions, and the receipts were 218*l.* 14s. 5d.; but for the year ending the 19th of March, 1870, payment was made on 19,620 separate occasions, the receipts being 480*l.* 14s. 6d. The balance-sheet shows that 2,552*l.* 11s. 9d. have been received, and 2,110*l.* 11s. expended in working expenses and repairs.

The Building Trade in Paris.—The following petition has been laid before the Corps Législatif:—

"Gentlemen,—We, the undersigned, have the honour of calling your attention to the consequences of the suspension of public works in Paris. Numerous constructions, contracted for and commenced some years since, are exposed to a probable decay, which will lead to heavy expenses for repairs. The various bodies of craftsmen connected with our business, which in the capital and its suburbs employs more than 200,000 men, are very sorely tried. Certain heads of establishments who used to employ on an average a thousand men, can now scarcely find work for a hundred, and the nine-tenths who remain idle of course suffer and complain bitterly. Our stock and trade materials are deteriorating, and the standstill brought on by the public administration has necessarily led to a scarcity of private enterprise. As a crowning misfortune, we cannot obtain payment of the large sums due to us from the city. This state of things places us all, both masters and men, in a state of embarrassment which cannot be continued without serious danger. We therefore pray you, gentlemen, to take some immediate steps for saving us from the calamities which threaten us, since all henceforth depends on you."

New Store for Castleford Co-operative Society.—The corner-stone of a new store in connexion with this society has been laid at Castleford. The society was formed by about a dozen persons in 1865, when operations were commenced in a small shop. In addition to extensive shops to be used as drapery and grocery stores, there will be a secretary's office, a library, and a reading-room, and other apartments, the chief of which will be an assembly-room capable of containing 450 persons. The building has been designed by Messrs. Maxwell & Tuke, of Bury. The cost of the new store will be about 1,586*l.* The land involved an outlay of 365*l.* 15s. The contractors for the erection of the building are Messrs. Kassell, Brothers, masons and excavators, Castleford; Messrs. Shuttleworth, Brothers, joiners, Keighley; Mr. J. Binns, plasterer, Castleford; Mr. T. Laister, painter, Castleford; Mr. Doyle, plumber, Leeds; and Mr. Pycock, slater, Leeds.

Society for the Encouragement of the Fine Arts.—On the 2nd Dr. Westland Marston delivered a lecture to the members of this society on the "Tragic Element in the Drama and Fiction;" Dr. Doran in the chair. The lecturer, premising that his address would be confined to a few hints connected with the present condition of tragic art, declared that at no previous period in the history of literature was there so much distaste for tragedy. Pleasure and deep spiritual emotion at the present day were incompatible terms, the popular taste being in favour of perilous adventures and miraculous escapes. One cause of this was the passion for realism which seized upon the photographic appearances of life, and neglected the essential parts; another the monotony of modern society that made it bad taste to feel, and reduced everything to a dead level of indifference. It was the fashion now to be ashamed of showing spirit. In some degree all art takes notice of externals, but it should not be bounded by them. At its close a short discussion ensued, in which Dr. Doran attributed much of the falling off in the tragic art to the want of appreciation on the part of actors. Dr. Doran drew a comparison between the methods employed by celebrated English and foreign actors, in order to raise their feelings to the proper pitch of tragic excitement, insisting that our actors had managed this more naturally than the French.

The British Association Committee on Sewage.—There seems to be a hitch in the working of this committee. It consisted of six members, nominated by the association; but at the suggestion of Mr. W. Hope, three professors, Williamson, Marshall, and Corfield, were nominated, as a sort of colleagues, or extra committee men; and these three, with Mr. Hope, have outvoted the other gentlemen present *and voting*, on a question of payment of personal expenses. The only voters in the minority, Professor Wanklyn and Dr. Paul, have accordingly written to the corporations, &c., subscribing the fund, and they state that the replies are to the effect that the very fact of a subscription to the committee implies that the personal expenses of the committee, as well as other expenses, are to be met by means of it. Mr. Hope and his nominees are not likely, therefore, after all, to be able to shoulder out the original committee and have it all their own way as to the disposal of the fund and the resultant disposal of the question of sewage treatment and utilisation. The minority question the right of the three professors to vote at all on the committee nominated by the association.

Summer Garden Society.—The inauguration of the pleasure-grounds of this society, situated within about a quarter of a mile of the Willesden Junction Station on the North London Railway, was celebrated on Sunday. These gardens have been established by a body of working men under the title of the Summer Garden Society, and will be conducted on a principle popular on the Continent, under the management of Mr. Henry Bolleter. The admission is by season ticket only, at the price of 1s., and admitting until September next, the children of members under twelve years of age being admitted free with their parents, it being the object of the society that the gardens should become a summer resort for families. On week-days, among the other amusements provided are cricket, bowls, quoits, athletic sports, and dancing, on a large platform, with special amusements for children. On Sundays the gardens will be opened in the afternoon for promenade, with instrumental band, which will play from four until eight in the evening. No persons but those holding season tickets will be admitted into the grounds.

Clifton, Beds.—In an outlying portion of this parish, called Clifton Fields, an infant-school has been erected, at the sole expense of the rector; and the village church has been provided with additional bells, for chiming. The original peal consisted of five bells, the tenor, or largest bell, weighing about 11¼ cwt.; to these ten have been added by the rector, chiefly with a view to the contemplated chimes. Messrs. Mears & Stainbank supplied the new bells. The chiming machine was manufactured and designed by Messrs. Gillett & Bland, at their steam clock factory, Croydon, Surrey. It is fixed in the same chamber (below the bells) as the clock with which it is connected by means of a lever, which sets the machinery in motion every three hours.

A New Motive Power in Aid of Steam. How to generate steam quickly, and at the same time inexpensively, has remained one of the problems left to engineers to solve. Mr. Galloway has invented an apparatus which, whilst it does not claim to supersede all steam boilers at present in use, yet claims that it can be affixed to them readily, and, once applied, save 50 per cent. in the cost of fuel, and pay for itself within one year. These are bold assertions, and well worthy of the consideration of those who use steam power. The invention, as we understand it, consists in the application of atmospheric air, which is first of all pumped down a pipe passing through the flue, the air being heated on its passage; the pipe is continued under the furnace, and passing through returns on the back under the fire bars; and the temperature of the air having thus become raised by the waste heat is driven into the boiler, and helps to generate steam in the chamber, the action of the piston rod assisting the process.

Royal Horticultural Society.—On Wednesday last the great show of the season at the gardens of the Royal Horticultural Society took place. The display of plants, flowers, and fruit was excellent, and may be regarded as in every respect successful. The attendance of visitors was very numerous. An important feature of the show was the exhibition of rhododendrons by Mr. Waterer, of Knaphill Nursery, under the marquee. Several thousands of trees were set in groups upon undulating land, and the masses of bloom of various tints, well arranged and divided by walks, to the spectator on an elevated spot, were very effective. In the general exhibition the orchids were a remarkable collection, and the fine foliage plants were numerous and of great merit. The azaleas were not quite so good as usual.

Oxford Architectural Society.—The members and their friends, to the number of twenty, have visited Rycote and Thame. The remains of the mansion at Rycote were first examined. They are but a small portion of the original mansion, which was almost a palace. Indeed, it was the residence for a time of two crowned heads. An account of the leading features of the church was read by Mr. Bruton. The members then continued their journey to Thame, when the chief points of interest in the church were described and pointed out by Mr. Payne, of Charsley's Hall. The Prebendal house was next visited; as also the grammar-school of Thame. The next excursion included Somerton, North Aston, Steeple Aston, Lower Heyford, Heyford Warren, and, if time permitted, Rousham. Warwick was next to be visited.

Broughton Footbridge, Manchester.—The ceremony of opening the new suspension footbridge which has been erected at the foot of Hough-lane, between Broughton and Peel Park, took place on Saturday afternoon. The centre opening is 135 ft. in length, but the entire length of the structure is 240 ft. The footway is 6 ft. wide, and the ironwork, of which there are some 20 tons, rests upon two stone piers, while the chains are attached to anchors of considerable weight on each bank of the river. The total cost of the bridge, which has been defrayed wholly out of the Broughton rates, is about 1,000*l.* The engineers are Messrs. Cawley & Newton, and the contractors for the ironwork, Messrs. W. Mabon & Co., Ardwick; and for the masonwork, Mr. E. Johnson, builder.

Hammersmith Bridge. — The annual general meeting of this company was held at the Freemasons' Tavern. The report stated that the tolls collected from the 25th of April, 1869, to 30th of April, 1870, amounted to 6,143*l.*, making the total receipts from all quarters, including a previous balance, 6,733*l.*, while the total expenditure had been 2,182*l.* A dividend of 2*l.* 2s. per share was recommended, which would absorb 3,313*l.* 16s.; and after increasing the reserve to 2,000*l.*, there remained a balance of 84*l.* in hand.

Royal Gallery of Illustration.—*Ages Ago* and *Beggar my Neighbour* are advertised for the last performance on June 18th. On the following Monday a novelty, from the pen of Mr. W. S. Gilbert, entitled *Our Island Home*, will be produced. For this Mr. German Reed has composed the music.

Cause and Effect.—A telegram from Madras says,—"Cholera is assuming an epidemic form. The effluvium from the river is frightful."

Northern Architectural Students' Society.—On the 31st ult., the winter session of this society was brought to a close. The members met in the anteroom of the Literary and Philosophical Society, and the report of the committee and the treasurers' statement were submitted and approved. The president (Mr. W. L. Newcombe) then delivered an address appropriate to the occasion, after which the election of officers for the ensuing year, took place with the following result:—President, Mr. W. L. Newcombe; vice-president, Mr. J. Morton; honorary secretary and treasurer, Mr. J. Oswald; committee, Messrs. Bedlington, Oliver, Spence, and Thornhill. During the summer the society will hold meetings occasionally at some of the most interesting buildings in the district.

Discoveries.—At Wigmore Castle, Herefordshire, the other day, some workmen, digging, found a dungeon communicating with another, of equal size, each about 15 ft. square, and covered with arched stone roofs. They were approached by means of stone staircases, which have been buried in the rubbish of the ruins for many years. In the stonework of the side-walls were embedded large, strong iron staples, supposed to have been used for securing prisoners during the civil wars.——A Gallo-Roman cemetery has just been discovered at Gièvres (Loir-et-Cher). A considerable number of urns and funereal vases of very curious workmanship have been found.

Christ Church Cathedral, Oxford.—The restoration of Christ Church Cathedral has been decided on, and will be commenced in the ensuing vacation. Much labour and cost will be involved in the restoration of the nave,—principally the windows. These windows were first of all Norman, and that next, for the most part, was altered to the Perpendicular, and finally, all the traceries were taken out to make room for the stained glass now to be observed therein. Such of the windows as were thus altered will be restored to the Perpendicular. The two in the south side will not be included in the list. These will remain Norman, in conformity with the chancel window, as it is to be.

Islington Workhouse.—A curious scene occurred at the meeting of the Islington guardians on the 3rd, the builder, Mr. Nutt, imploring the architect, Mr. Burden, to go round the building with him and point out what was not to his satisfaction; and the architect resolutely refusing to do anything of the sort until Mr. Nutt had written him a letter saying that the works had been carried out in accordance with the specification. The Guardians begged and prayed, but all in vain. Ultimately, however, the architect agreed to go over the works with a sub-committee of the Board, the builder and clerk of the works being present.

The New Market, Madeley.—Arrangements having been made with the lord of the manor for holding a market here, and for the erection of a suitable building, a contract has been entered into with Messrs. Nevitt Brothers, of Ironbridge, for its erection, and the work is now being proceeded with. The building will be 50 ft. by 70 ft. in the interior, and will consist of red and white brick, with iron roof. The front will have a parapet, also two entrances, and the interior will be well supplied with stalls, classified to suit dealers in various kinds of goods.

Enormous Conflagration at Constantinople.—A fearful fire has occurred in Pera. In consequence of a strong wind the flames spread with alarming rapidity, and the English Embassy, the American and Portuguese Consulates, the Naoun Theatre, the Palace of the Armenian Patriarch, many churches, mosques, and several thousand houses and shops in the finest part of Pera, were completely destroyed. Several persons were killed and others wounded. The loss is immense. Thousands of families are rendered homeless.

Theatrical Scaffolding.—A sad accident has occurred in the Alhambra Music-hall, Leicester-square, through carelessness in the fixture of a scaffolding on which fourteen or fifteen young girls were placed. No less than eleven of them were injured, some of them very seriously, the arm of one being broken, the ankle of another dislocated, a rib of a third broken, and others bruised. Nothing, probably, but fear of the manager's personal inspection of such scaffoldings can prevent such carelessness and such "accidents." Official inspection is, we suppose, out of the question.

Value of Land in Walworth.—At a sale of fifty-one building plots, fronting or abutting upon a new street, lately let by auction, large prices were obtained. The lots cover about an acre and a quarter of land, and the ground-rents reached a total of 494*l.* 10*s.* per annum. This is at the rate of 395*l.* 12*s.* per acre, which, capitalized at twenty-five years' purchase, gives 9,890*l.* per acre as the value of the fee simple.

The Thames Embankment.—The Board of Works has decided that the name Victoria Embankment shall be applied to the Northern Thames Embankment, and Albert Embankment to that on the south side of the river.

TENDERS.

For enlargement of house for Mr. J. H. Clarke, at Castle-hill, Maidenhead. Mr. J. H. Rushforth, architect:—

Rogers	£2,589 0 0
Dove	2,495 0 0
Simpson	2,485 0 0
Silver & Son (accepted)	2,459 0 0

For house and shop, High-street, Kensington, for Mr. Joseph Toms. Mr. John Cox, architect. Quantities supplied by Mr. Sidney Young:—

Hockly	£4,840 0 0
Roberts	4,769 0 0
Conder	4,517 0 0
Manley & Rogers	4,396 0 0
Scrivener & White	4,288 0 0
Cooke & Green	4,267 0 0
Longmire & Burge	4,255 0 0
Goodman	4,195 0 0

For a detached villa at Croydon, for Mr. Heslop. Messrs. Hine & Sons, architects:—

	1st.	2nd.
Pollard	£1,840	£1,902
Shilleto	1,525	1,589
Roberts	1,400	1,425
Glaskin	1,398	1,498
Nightingale	1,350	1,440
Jarrett	1,330	1,390
Sharpington & Cole	1,313	1,384
Hallidge	1,310	1,380
Woodward	1,280	1,355
Peskett & Taylor	1,274	1,354
Bowler & Co.	1,248	1,177
J. & A. Wright	1,247	1,317
Laurie	1,246	1,316
Wood & Co.	1,229	1,290
Willoughby & Mead	1,152	1,213
Thomas	1,142	1,208
Hutchinson (accepted)	1,100	1,160
Mason & Brisbey	1,079	1,140

For St. Paul's Vicarage House, Peterborough. Mr. E. Browning, architect:—

	House.	Stable, &c.
Perkins & Sons	£1,407 0 0	£110 0 0
Richardson & Roberts	1,343 0 0	104 0 0
Halliday & Cave	1,320 0 0	103 0 0
Hobson & Taylor	1,297 0 0	100 0 0
Thompson (accepted)	1,287 10 0	106 0 0

For new schools for district of St. Mary, Kilburn. Mr. William Smith, architect:—

Brown	£1,494 0 0
Foxley	1,366 0 0
Yerbury	1,307 0 0
Patman & Fotheringham	1,298 0 0
Keyes & Head	1,282 0 0
Sawyer	1,244 0 0
Newman & Mann	1,216 0 0
Manley & Rogers (accepted)	1,157 0 0

For repairing twenty-four houses at Upper Sydenham, for British Empire Life Assurance Company. Mr. McDougald, architect:—

Williams & Son	£777 0 0
Pierpoint	738 0 0
Sayer	726 0 0
Davies	578 0 0
Stoner	557 0 0
Roy	535 0 0

For repairs to four houses, Acacia-road, Sydenham, for the above Company:—

Sayer	£490 0 0
Pierpoint	380 0 0
Williams & Son	325 0 0
Roy	275 0 0
Stoner	243 0 0

For repairing thirty houses, Chaplin-street, Forest-hill, for the same Company:—

Williams & Son	£933 0 0
Roy	897 0 0
Pierpoint	793 0 0
Stoner	787 0 0
Davies	755 0 0
Sayer	675 0 0

For enlargement of Countess of Huntingdon's College, Cheshunt. First portion. Messrs. Lander & Bedells, architects. Quantities supplied:—

Patman & Co.	£5,079 0 0
Williams & Sons	5,050 0 0
Manley & Rogers	4,969 0 0
Sewell & Son	4,953 0 0
Mann	4,895 0 0
Brass	4,882 0 0
Browne & Robinson	4,862 0 0
Axford	4,775 0 0
Grover	4,748 0 0
Henshaw	4,745 0 0
Egan	4,709 0 0
Dove, Brothers (accepted)	4,475 0 0

For two proposed houses in Wynne-road, Brixton. Mr. E. G. Colman, architect:—

Kent	£2,350 0 0
Drury	1,983 0 0
Maxwell	1,950 0 0
Brashier, jun. (accepted)	1,845 0 0

For two houses at Hendon, for Mr. P. Rouse. Mr. S. J. Nicholl, architect:—

I'Anson	£4,475 0 0
Donn	4,398 0 0
Longmire & Burge	4,395 0 0
Kilby	4,187 0 0
Manley & Rogers	4,152 0 0

For rebuilding No. 3, King-street, Cheapside. Mr. H. Christian, architect:—

Cook	£1,988 0 0
Fish	1,951 0 0
Ashby & Horner	1,670 0 0
Ashby & Son	1,633 0 0
Jackson & Shaw	1,605 0 0
Brass	1,567 0 0
Sharpington & Cole	1,497 0 0

For the erection of seed stores, Reading, for Messrs. Sutton & Sons. Messrs. Wm. & J. T. Brown, architects. Quantities supplied:—

Dunn	£710 6 0
Wheeler, Brothers	700 0 0
Sheppard	697 0 0
Strong	690 0 0
Barnicoat	685 0 0
Woodroffe (accepted)	677 10 0

For making certain alterations and additions to Huntercombe House, near Maidenhead, Berks. Mr. C. E. Davis, architect. Quantities supplied by Mr. G. W. Ranwell:—

Silver & Son	£1,540 0 0
Webb	1,475 0 0
Reavell	1,400 0 0
Almond & Webb	1,372 0 0
Woodbridge	1,370 0 0
Nightingale	1,328 0 0
Taylor	1,246 7 0
Gibson, Brothers (accepted)	1,234 0 0

For new brewery and stables, for Messrs. W. & R. Richards, Shepherd's-bush. Messrs. Davison & Scamell, architects. Quantities by Messrs. Curtis & Son:—

Myers	£3,850 0 0
Hockley	3,686 0 0
Brass	3,589 0 0
Hill & Co.	3,540 0 0
Ashby & Co.	3,510 0 0
Scrivener & White	3,417 0 0
Hart (accepted)	3,250 0 0

For alterations and repairs at the Home Farm, Halstead, Kent, for Mr. J. P. Atkins. Mr. John Jeffkins, architect:—

Yates	£850 0 0
Banks	534 0 0
Grover (accepted)	451 0 0

For alterations and repairs to eight cottages, called Yew Tree-row, Halstead, Kent, for Mr. J. P. Atkins. Mr. John Jeffkins, architect:—

Blundell	£196 10 0
Grover (accepted)	121 0 0

For a pair of semi-detached villas, for Dr. Hirschfield. Mr. W. K. Knapp, architect:—

Capps & Ritso (accepted)	£2,400 0 0

For house at Sevenoaks, for Mr. A. Wilson. Mr. J. M. Hooker, architect. Quantities supplied:—

	House.	Stables.
Myers & Sons	£3,176	£254
Hart	2,600	195
Dove	2,595	185
Dove, Brothers	2,565	195
Wallis & Clements	2,550	200
Sharpington & Cole	2,533	200
Henshaw	2,543	185
Jackson & Shaw	2,522	198
Longmire & Burge	2,511	194
Anscomb	2,448	190
Turner & Sons	2,387	295

For house at Sevenoaks, for Mr. Lyall. Mr. J. M. Hooker, architect. Quantities supplied:—

Anscomb (accepted)	£2,655 0 0

For new lecture-hall, Hare-court Chapel. Mr. Thomas Chatfeild, architect:—

Ashby & Sons	£1,305 0 0
Dove Brothers	1,295 0 0
Conder	1,202 0 0
Williams & Son	1,288 0 0
Higgs	1,234 0 0
Browne & Robinson	1,190 0 0
Scrivener & White	1,153 0 0

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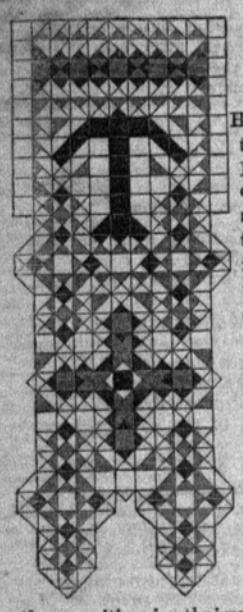
VOL. XXVIII.—No. 1428.



Architecture and Legislation.

THE juxtaposition on our table of several forms of Building Act, proposed or in force, suggests some observation as to the manner and degree in which legislation of this nature affects architecture as an art, and whether prejudicially or otherwise. In the main, of course, such Acts have a practical object only, that of insuring sanitary and constructive safety and completeness in the street buildings of large towns, and are for the most part negative rather than positive in their provisions, and scarcely affect general architectural construction, as they are only designed to insure a certain minimum of provision for stability, quite below what in most cases would be deemed a necessary foundation for anything like an effective architectural design. Where the provisions of the Building Acts infringe at all upon the province of the architectural designer, it is commonly in the "preventive service,"—in forbidding as contraband nearly everything which goes to make a building picturesque and effective. What would have become of those picturesque bits of old street architecture in some of our own as well as in Continental towns, which painter and architect alike delight to sketch, had those who were to erect them been clogged by such a sentence as this, enforced by official warrant:—

"No projection shall be built or made from or before any building in any street within 10 ft. above the level of the foot-pavement of such street, so as to extend beyond the general line of the walls of the building, except architectural decorations attached to, or forming part of, an external wall, and projecting *not more than* 3 in. therefrom; and no cornice, coping, or balcony above the level of 10 ft. from the foot-pavement of such street, shall project more than 18 in. in streets not exceeding 30 ft. wide, and no other architectural decoration above the level of 10 ft. above the street shall project more than 6 in.," &c.

This is from Section XXIV. of a proposed new Building Act for Liverpool, originally intended to have been brought before Parliament this session, but which is at present in abeyance. We do not say at once that some such clause may not be absolutely necessary in relation to buildings which are to flank crowded thoroughfares, and where provision must be made to obviate unnecessary drip in wet weather, as well as possible danger from imperfectly-constructed overhanging features. But under such regulations, what would become either of such buildings as those in the Florentine palatial style, with its grand projecting cornice, or of the aforesaid picturesque oriels and corbelled upper stories of Mediæval Germany? It should seem, according to this, that we must choose between safety and commodiousness on the one hand, and architectural effect on the other hand, as regards street architecture. Must we really accept this fate? Is there no safe steerage between Scylla and Charybdis, no compromise possible between the requirements of the architect and of borough officials? At all events, this species of restriction has been of pretty long date in Liverpool, for we find, under the Section LXVII. of the existing Building Act for that borough a similar provision in even more stringent terms:—

"And be it enacted that no projection of any kind shall be made in front of any building over or upon the pavement of any street, *except for shop fronts* or for doorways, and no part of such shop front or doorway in streets under 10 yards wide . . . . shall project more than 6 inches, except the cornice, which may project 18 inches, &c. Provided always, that it shall be lawful for any person, with the consent in writing of the Council, testified by a copy of some resolution in writing of the Council, certified under the hand of the Town Clerk, and also with the consent of the Commissioners for the better paving and sewerage of the town of Liverpool, testified by a copy, &c. (as before)—to build with or add to, or cause to be built with or added to, any building fronting any street, any projecting pilaster which shall not project more than 6 inches, or, in streets more than 10 yards wide, more than 12 inches from the perpendicular line of the front brick or stone work of the building where it fronts such street."

This solemn and elaborate preparation for the legalising of the regulation shop-front pilasters, the most thorough specimen of bastard architecture in existence, is amusing enough in its way, but it is difficult to know why the framers of Building Acts should show such a special delicacy of feeling with regard to shop-fronts. The fact is that the prevailing style of shop-front architecture is the curse of our towns, architecturally; and so far from seeing clauses made specially to facilitate this sort of production, we would rather see it negatived by some deftly-framed prohibitory clause, that no one shall dress up his shop front in wooden pilasters and sham architraves, but erect it in an honest and solid manner on sufficient brick or stone piers, &c. The proposed Metropolitan Building Act does offer some slight check upon over-much of cradling and bracketing architecture, in the provision (clause 69), that,—

"No part of the woodwork of a shop-front shall be fixed higher than *eighteen feet* above the level of the nearest public way, or nearer than *four inches and a half* to the line of junction of any adjoining building; and a pier or corbel of brick, or other fire-resisting material, at least *four inches and a half* thick, shall be built or fixed next to such adjoining building, as high as any such woodwork is fixed, and projecting, at least, to the extent of such woodwork."

This is a provision in favour of actual, though not of apparent, solidity of construction; but it is to be regretted that a Bill, formed partly under architectural direction, should, while putting a veto (by the clause demanding that all walls be "of brick or stone") upon any kind of genuine timber construction even for shop-fronts, make special encouragement or provision for a conventional screen of wood used in a non-constructive manner. In this point, the old and proposed Liverpool Building Acts also coincide; and we fully concur, as our readers are aware, in the prohibition or discouragement of timber construction in large towns; but it is a pity to see a false use of woodwork encouraged, at the expense of a genuine and true use thereof. The proposed new Liverpool Building Act, it may be observed, ignores wooden bressummers altogether, decreeing iron in all cases; a decree scarcely necessary, since a good wooden beam may be as durable as an iron one; certainly, there are wooden bressummers in existence and in good bearing condition, which have stood a longer test of time than we have been able to put iron beams to as yet.

In the matter of roofing, it is worth notice that none of the Acts before us recognise, or at all events encourage in their wording, the portentously high Mansard roofs, which are at present such a feature in all exhibitions of architectural drawings. The existing Liverpool Act, in scheduling thicknesses of walls and other matters with reference to height, makes no account of stories in the roof; and the proposed Metropolitan Act specially provides that "in a building used wholly or in part as a dwelling-house, there shall not be more than one story of rooms constructed wholly or partly in the roof, except with the permission of the Board;" and further that "in a building used wholly or in part as a warehouse, or for purposes of business, and not used in any part as a dwelling-house, there shall not be any story of rooms constructed wholly in the roof." Such a regulation would probably be equally desirable on constructive and architectural grounds; but some of our warehouse and hotel designers will be shorn of the strength residing, not "in their hair," but in their roofs, by this Delilah of legislation. As to the constructive material of decorative adjuncts, the Metropolitan Bill provides, in general terms, like the existing Act, that "any cornice, coping, facing, window-dressing, portico, porch, balcony, verandah, and balustrade, and every projection or architectural decoration whatever, and also the cornices of any overhanging roof shall, except with the approval of the Board, be of stone brick, tile, artificial stone, vitrified stoneware, slate, cement, or other fire-resisting material." This, of course, precludes wooden ornament, and may deliver us from we know not what possible fantastic tricks of barge-boards and finials; but then we have a parenthetical clause excepting from this dictum not only dwelling-houses "distant at least 15 ft. from any other building," but also "cornices and dressings of window fronts of shops;" and why, we again ask, this exceptional permission to shops to adorn themselves with combustible adjuncts not permitted, in the same situation, to any other class of building? Is it impossible for tradesmen to sell goods without hanging a wooden cornice over their inevitable sheet of plate-glass? It is satisfactory to find there is a limit beyond which masonry piers must be introduced. "When a building, enclosed with walls, is constructed so as to leave on the ground story, or on that story and another story or stories, an extent of opening greater than *one-half* of the whole area of the vertical face, or elevation of the wall or story or stories in which such opening is left, there shall be sufficient piers of brickwork or other fire-resisting material so disposed as to carry the superstructure." This would put an end to the erection of some marvellous webs of iron and glass which in the streets of certain towns we have seen towering from pavement to cornice; but we cannot help thinking such stipulations might be carried further, and shop-fronts be compelled to rest in all cases on adequate brick or stone piers. As to the gain in architectural appearance we need say nothing; possibly such a regulation might be accompanied in time by the further advantage of checking the system of competition in mere showiness and ostentation of goods between tradesmen, and suggest a habit of depending for success more on actual excellence and less on show. If the present aspect of shop architecture reflects (as we think it does only too truly) the falsity and flimsiness of much of our trade materials and trade principles, is it impossible that there should be a converse action, and that a better style of shop architecture, thrust upon them whether they will or no, should exercise a beneficial effect upon the tradesmen of England?

The proposed Act for Liverpool deals a blow at stone lintel construction in the provision that "every opening above 2 ft. 6 in. in width which is not arched over throughout the thickness of the wall, or which has not an iron lintel, shall have a discharging arch of brick or stone." The rule does not define whether a window with a stone head and one or more stone mullions is to be classed as one opening without regard to the mullions, or not. It may be pointed out that in certain positions (*i.e.*, near the angle of a building) the "relieving arch" might have a tendency to disturb rather than assist the stability of the structure, by bearing horizontally on the angle pier. When we come to the roofs of our buildings, we find Building Act directions in general a good deal at variance with architecture. The present Liverpool Act, after some definitions and restrictions as to party walls, provides always "that nothing in this Act shall prevent any person from carrying up any wall above the

slates of the roof to form a parapet," &c. Not unfrequently it has been found that when a parapet wall has been built over the cornice line, there has been "nothing to prevent" it coming down into the street at very short notice; but the Metropolitan Act is to provide that every building adjoining a street *shall* have a parapet at least 1 ft. above the gutter. Why the parapet wall, which practically affords the opportunity for distributing an overflow of rain-water *within* the building instead of outside it, and which architecturally gives the roof the appearance of sinking into the building instead of covering it, should be a feature so favoured by the framers of Building Acts we do not very well understand. The suggested development of party walls generally above the roof is, indeed, rather alarming to contemplate, and sometimes not a little puzzling. Thus the new Liverpool Act directs not only that "every party wall shall be carried up above the roof, flat, or gutter of the highest building adjoining thereto, and also above any part of such roof as shall be within the distance of 3 feet opposite thereto;" but also that "every party wall shall be carried up above any turret, dormer, lantern, or other erection of combustible material on the roof or flat of any building within 4 feet of such party wall," &c. The general impression conveyed by this, after two or three perusals, is, that something on every roof shall be higher than something else on another roof; at all events, the system of "slighting or overcrowing" (as Dugald Dalgetty would say) all erections on your neighbour's roof by a brick wall on your own, would be difficult to carry out in some cases, and leads to some painful considerations as to possible appearances resulting from the rigid enforcement of the principle. The Metropolitan Act gives the same directions in rather more perspicuous wording. We question whether the evident object, the prevention of the spread of fire, would really be attained in any marked degree by these provisions; and the amount of otherwise useless brickwork with which our roofs must be cumbered in accordance with such directions is a matter not to be (and which, indeed, in a literal sense, we fear *cannot* be) left entirely out of sight.

So far as the examples of architectural legislation before us are to be taken as specimens, it would appear that the tendency of such legislation is to steer clear of any precise reference to architectural features, except with regard to those which, whether rightly or wrongly, are most universally employed, and to make exceptions in favour of these only, placing all others under rigid restrictions. The result is to make the Building Act, in the main, an engine for the favouring and evoking of architectural commonplace, and throwing obstacles in the way of architectural invention. And, of course, it is impossible to legislate definitely, except upon practical matters. But it seems a pity that the framers of such Acts should not have more before their minds the interests of architecture, and provide for judicious deviation from the rules so rigidly laid down by more general provisions.

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THE existing remains of English glass of the fifteenth century appear to be about as numerous as are the examples of the previous period.

Cambridge possesses some glass of this date, in the chantry of Provost Brassie, removed in 1857 from one of the vestries, and restored by Mr. Constable, representing prophets and apostles.

Canterbury Cathedral, in the north transept, has a painted window, the gift of Edward IV. and his Queen; their own figures, those of their two sons (the princes murdered in the Tower), and those of their daughters, still remaining in it.

In the Church of *Dorchester* (Oxon) is a window of four lights, representing the Stem of Jesse, which affords a unique example of the combination of stonework and stained glass in one mystic design.

In *Durham* Cathedral, the west window represents the tree of Jesse. The window of the south transept illustrates the *Te Deum*. The date is 1450.

The windows of the north aisle of the Church of *Eaton-Socon*, Bedfordshire, represent the legends of St. Nicholas and St. Etheltbreda. The costumes are of the period of Edward IV.

The stained glass in the east window of the Chapel of St. Gabriel, in *Exeter* Cathedral, dates in the first half of the fifteenth century.

The series of five windows representing Scriptural subjects, apostles, prophets, Roman emperors, &c., of *Fairford* Parish Church (Gloucestershire), were taken in the year 1492 on board a Flemish vessel. Some have attributed the workmanship to Albert Dürer. Copies of these windows are now in course of completion for the South Kensington Museum.

The painted windows of the Church of *Gatton*, Surrey, filled with sacred subjects, were removed from the Cathedral of Aerschot, near Louvain. They are Flemish fifteenth-century work.

In the Lady Chapel of *Gloucester* Cathedral the headings of the window lights retain their original glass. The east window is also filled with fifteenth-century glass, white and yellow being much employed.

At *Levington*, Cambridgeshire, the early Perpendicular east window contains a tree of Jesse. The east window of the north aisle represents, in the five larger lights, ten Jewish kings, each attended by a prophet or a saint, with a motto on a scroll. In the smaller compartments are figures of the Virgin Mary, the Evangelists, and other personages, interlaced by a pattern of vine branches. On the south side of the chancel is our Lady of Pity, with a knight and a lady kneeling on either side.

The remains of glass in the north and south choir aisles of *Lincoln* Cathedral are of a Perpendicular character.

In the Wenlock Chapel, in the *Luton* Church, the upper compartments of the windows are painted with small figures of saints and angels, on a ground of plain glass, charged with various small devices, the arms of John, Lord Wenlock, the founder, within the garter, and several other escutcheons, being scattered about beneath the figures.

The patterned glass windows of the Bede House Hall, at *Lyddington*, Rutlandshire, are of the latter part of the fifteenth century.

The west window of the south side of the choir of the Priory Church of *Great Malvern* was presented by Richard III. It contains twelve full-sized figures. Six windows on either side of the choir, and the east window of the church, contain much stained glass of the same date. There are illustrations of the Life of Christ, the Last Supper, and heads of saints, surrounded with glories, in the latter. The foundation of the priory, by Saint Werstan, King Edward the Confessor, Bishop Wolstan, and other bishops and priors, the marriage of Jehoiakim and Anna, the Crucifixion, and the Annunciation, are among the subjects illustrated in the side windows. In the Jesus Chapel the north window contains four gospel scenes, and the portraits of Arthur Prince of Wales, son of Henry VII., and of Sir Reginald Bray, privy councillor to that sovereign, which are the only perfect remains of a series described by Habington, *temp.* Charles I.

There is painted glass, in the Perpendicular style, in the church of *Mells*, Somersetshire; one window containing a figure of Mary Magdalene.

The glass in the windows of the chancel and nave of *Nettlestead* Church, Kent, is in good condition. The date is 1465.

The hall windows of *Ockwell's House*, Berkshire, are filled with heraldic glass of the middle of the fifteenth century.

In the series of illuminated windows in churches and chapels at *Oxford*, glass of the fifteenth century is to be found in the west window of Christchurch Cathedral, in the Church of St. Peter-in-the-East, in St. John's Chapel, Merton College, and in the hall, New College.

Windows of the fifteenth century exist in the Church of *St. Rew*, Cornwall.

The Church of St. Thomas, *Salisbury*, contains in the windows of the south aisles painted glass of the time of Henry VI. In the banqueting-hall of John Hall, in the same city, is glass of the same, or of the succeeding, reign.

In the south aisle of *Tickhill* Church, Cornwall, is a "Creed window," in which each of the apostles is represented, accompanied with the article in the apostles' creed traditionally ascribed to his authorship.

The glass in the east and side windows of the Beauchamp Chapel, *Warwick*, was executed by John Prudde of Westminster, A.D. 1447.

The arms of Bishop Babwith (three chaplets of holly) in the window of the chapel of the Vicar's Close, *Wells*, date 1407 A.D.

Winchester contains windows in the refectory of the hospital of St. Cross representing the arms of Cardinal Beaufort, of the latter half of the fifteenth century. Fragments of the time of Edward IV. and Henry VII. are in the library window of the college, in those of St. John's Church, and in the east window of the cathedral.

York is rich in stained glass of the fifteenth century. The west window of the cathedral is by John of Coventry, date about 1404. The east window of the choir is by the same artist, containing 115 Scriptural subjects, each about 2 ft. 2 in. high. In the window of the north choir aisle Archbishop Bowet is represented on his knees before an altar, surrounded by shields charged with the arms of his family. In the south transept eastern aisle is glass of the reign of Henry IV. Glass of the same century is to be found in the windows of All Saints' Church, and in those of St. Martin's Church in the same city.

Glass of the Sixteenth Century.

Some Flemish and German glass of the sixteenth century, A.D. 1537 to A.D 1543, is in the windows of the Mayor's Chapel of St. Mark, *Bristol*.

Twenty-six large stained-glass windows, forming a complete history of Our Lord, beginning from the birth of the Virgin Mary, are in King's College Chapel, *Cambridge*. The date is 1527–1531. In the chantry of Provost Brassie, in the same town, is some glass of the same age, restored by Mr. Constable.

Durham Cathedral has a marigold window, with fragments of sixteenth-century glass, in the Chapel of the Nine Altars.

Lichfield Cathedral contains some Flemish glass, from the Cistercian Abbey of Herckenrode, near Liége, dating 1530–1540 A.D. In the aisle of the south transept is to be seen Mary Magdalen at the foot of the Cross, together with the figures of benefactors to the Abbey. In the south choir aisles, we have the Holy Trinity in the centre, a knight supported by St. Hubert on one side, and a shield of arms on the other. In the Lady Chapel are five windows representing subjects from the New Testament, and two containing kneeling portraits of patrons and benefactors of Herckenrode.

The east window of St. Margaret's Church, *Westminster*, is said to be the finest specimen of stained glass in London. It is in the early cinque-cento style, and was executed for Henry VII. at Gouda.

A glass window of this period, from the Cathedral of Basle, is in the possession of Mr. William Smith, Upper Southwick-street, *London*.

Oxford contains glass of the sixteenth century in the Church of St. Peter-in-the-East, in the hall of New College, and in the Bodleian Library.

In the Church of *St. Neot's*, Cornwall, are six windows, containing Old Testament subjects, of the early part of the sixteenth century. There are also portraits of benefactors, patron saints, labels, the history of St. George, and the legend of St. Neot, each adorned with inscriptions.

The west window of *Salisbury* Cathedral contains the shield of arms of Bishop Jewell. Date, A.D. 1562.

Southwell Minster has the four lower east windows of the choir filled with French cinque-cento glass paintings, presented by Mr. Gally Knight in 1818, representing the Baptism of Christ, the Raising of Lazarus, the Triumphant Entry into Jerusalem, and the Mocking of Christ by the Jews.

In the west window of *Wells* Cathedral is cinque-cento glass, brought partly from Rouen, and partly from Cologne, by Dean Creyghton, illustrating the life of John the Baptist. The date, 1507, is traceable on one of the lights.

Winchester Cathedral has the east window filled with Perpendicular painted glass of a date a little earlier than 1525, the work of Bishop Fox, whose arms and motto, "*Est Deo Gratia*," are introduced. In point of execution it is said to be as nearly perfect as painted glass can be. In both aisles of the choir, and in the clear-story windows, as well as in the east window of the south transept, are also remains of cinque-cento glass.

There is glass in *York* Cathedral referred to the sixteenth century; but the description of its date and character is contradictory.

The famous windows which the Constable Anne de Montmorency commissioned Bernard Palissy to paint for the Château of *Ecouen*, representing the history of Psyche, have been removed to the residence of M. le Duc d'Aumale, at Twickenham.

* See p. 458, ante.

Glass of the Seventeenth Century.

The windows of the aisles of the choir in *Bristol* Cathedral are filled with enamelled glass of the seventeenth century. The subjects are, on the north side, Jonah escaping from the whale, the Ascension, the Agony in the Garden, the Ascension of Elijah, and the Sacrifice of Abraham; those on the south are the Expulsion of the Money-changers, Jacob's Dream, the Tribute Money, Melchisedec and Abraham, and Gideon and the Fleece. Much of the original glass has been replaced by "pot glass." The jumble of subjects is unprecedented.

The stained-glass windows of Archbishop Abbot's Hospital Chapel, *Guildford*, date in the seventeenth century.

The Flemish painted glass in Lincoln's-inn Chapel, *London*, is by Abraham Van Linge. Date, A.D. 1640.

The glass in the six-light window of the north transept of *Malvern* Priory Church, containing full-sized figures of St. Paul, St. John Evangelist, and St. John Baptist, and passages in the life of Christ, divided by labels, is German, of the seventeenth century.

The windows of the Church of St. Stephen, *Norwich*, date A.D. 1601. Those of the Church of St. Michael Coslany, in the same city, date in 1610.

In *Oxford*, the window of the south aisle, the north transept, and the transept aisle, of Christ Church Cathedral, were executed by Abraham Van Linge, A.D. 1630—1640. St. Peter's Deliverance from Prison, in the north aisle, is by Isaac Oliver, A.D. 1700. There is also glass by Van Linge in Balliol College Chapel, in Lincoln College Chapel, in Queen's College Chapel, in University College Chapel, as well as glass of the same date in the Chapel of Magdalene College.

Glass of the Eighteenth Century.

Bristol Cathedral exhibits in its west window inferior stained glass, dating 1710, A.D.

The blazonry in the upper part of the east window of *Exeter* Cathedral is dated A.D. 1766.

The great west window of the nave of *Lichfield* Cathedral is by Brookes, A.D. 1776.

In *London*, the Resurrection and the Last Supper, by Joshua Price, are represented in the Church of St. Andrew, Holborn, date A.D. 1718. There is some late Flemish glass in the Church of St. George, Hanover-square.

Oxford has glass painted by Joshua Price, *circa* A.D. 1702, in the chapels of Magdalene and of Merton Colleges; and eighteenth-century glass in the Church of St. Peter in the East, and New College Chapel.

The east window of *St. Asaph* Cathedral was glazed by Eggington after a picture by Albano. Date, A.D. 1780.

The Elevation of the Brazen Serpent, designed by Mortimer and executed by Pearson, the gift of the Earl of Radnor, fills the east window of the choir of *Salisbury* Cathedral. Date, A.D. 1781.

The west window of *Worcester* Cathedral dates A.D. 1792.

The rose-window in the north transept of *Westminster* Abbey was filled with stained glass in A.D. 1722. The great west window was executed in 1735. Neither of these windows is mentioned in the "Universal Art Inventory."

In the chapel of Heriot's Hospital, *Edinburgh*; in the cathedral churches of *Ely*, *Peterborough*, and *Ripon*; and in the churches of *Morley*, Derbyshire; *Rivenhall*, Essex; and *West Wickham*, are painted windows, cited in the Inventory, the dates of which are not stated.

We thought it due to our readers, as before hinted, to verify the references which are so freely made in Mr. Cole's Inventory, to the late Mr. C. Winston's valuable work on ancient glass. As far as the general index of this work is concerned, the churches named therein are all duly to be found in the Art Inventory. But in the woodcuts, the coloured plates, the preface, and the appendix, to this volume, occur the following additions to the information given in the Art Inventory. They will be found to be neither few nor unimportant.

Early English glass is figured from a lancet window in the Church of *Stockbury*, Kent, of the latter part of the thirteenth century.

A lancet window of pattern glass, in the Church of *Stanton Harcourt*, Oxfordshire, dates in the third quarter of this century.

Decorated glass, of the first quarter of the fourteenth century, is to be found in the cinquefoil tracery lights of two windows in *Newark* Church, Sussex.

The same date is attributed to a patterned panel and figure, in brown enamel, in *Snodland* Church, Kent. A St. Mathew in a tracery light dates some fifty years later.

In a tracery light at *Westonbirt*, is a shield, with the arms of Berkely, in brown enamel, dating soon after 1361.

At *Southfleet*, Kent, exists a patterned window of coloured glass, of the third quarter of the fourteenth century.

At *Worfield*, Kent, a head in brown enamel dates before the middle of the fourteenth century.

From *Urchfont*, Wilts, we have a patterned quarry, painted with a leaf in brown enamel, of the same date; and a *fleur de lys* from *Great Dunmow* Church, Essex, is an example of an heraldic bearing of the period.

Perpendicular glass of great beauty is figured by Mr. Winston from *Wanlip* Church, Leicestershire, containing a complicated emblem of the Trinity, and the arms of John of Gaunt and of Thomas of Woodstock, *cir.* 1393.

Woodmansterne Church, Surrey, has a *credo* figure, or apostle, in brown enamel, of the third quarter of the fourteenth century.

From *Much Hadham* Church, Herts, we have a circle containing the monogram I.H.S., surrounded with the motto, *hoc est nomen super omne nomen.*

Stoating Church contains two portraits of members of the Stotque family, of the early part of the reign of Edward IV. Two female heads, of the same date, in yellow and brown, are to be found in *Thaxted* Church, Essex; and tracery lights in the Church of *Temple Rothley*, Leicestershire, are of the same date.

At Reynold's-place, *Horton Kirby*, Kent, are the arms and crest of John Bowes, who died 1595 A.D. At *Franks*, Kent, are the Bathurst arms, dating 1591. From *Lambeth* Palace is figured a lily, in stained glass, forming part of a border round the arms of King Henry VII.

Mr. Winston further cites, as instances of false heraldry in glass, arising rather from the exigencies of the material than from the ignorance of the artist, the Royal arms of Edward II., in the Church of *Fawkham*, Kent; the arms of the family of Brockhall, *temp.* Edward III., in *Lukingstone* Church, Kent; those of Bowes, in *North Cray* Church, in the same county; and those of Philip II. of Spain, in *Wilton House*, Wilts.

Monumental inscriptions, in most instances accompanying portraits, in stained glass, are cited as existing in painted windows at St. Michael's Basishaw, Kediton, Chart Magna, Wellsborough, Tunbridge, Holywell Priory, Great Thorndon, Cotes Church, Danthorp, Barley, Great Malvern, Afford, and Wanlip. Thus the illustrations of Mr. Winston's book alone supply some thirty-five additions to the Art Inventory.

A still larger number of churches containing old stained glass is referred to, in topographical order, in Mr. Franks's "Book of Ornamental Glazing Quarries," published in 1849. This valuable monograph contains numerous drawings of panes or quarries of old stained, painted, or enamelled glass, each of which contains a perfect pattern, and not a mere portion of a general design. These are distributed as follows:—

Berkshire.—Cholsey, Moreton, Wantage.
Bucks.—Ickford, Kimble Power.
Cambridgeshire.—Bourne; King's, Queen's, and Emmanuel Colleges, Cambridge; Chesterton, Ely Cathedral, Fulbourne, Girton, Hardwick, Hildersham, Melbourne, Milton, Waterbeach, Wimpole.
Devon.—Exeter Cathedral.
Essex.—Bromley, Chignal, Swealy, Good Easter, Marks Tey, Pebmarsh, Takely, Thaxted.
Hants.—Winchester, St. Cross and St. John.
Hereford.—Mansley.
Herts.—Great Berkhampstead, Walton.
Kent.—Bethersden, Fawkham, Hardres (Upper), Kemsing, Penshurst, Southfleet, Westwell.
Lincolnshire.—Lincoln Minster.
Middlesex.—Greenford.
Norfolk.—Bexwell, Bressingham, Holm Hall, Southacre.
Oxfordshire.—Chakendon, Headington, Marston; Merton College, Oxford; Stanton Harcourt, Warborough, Wattington.
Somersetshire.—Taunton.
Suffolk.—Brandeston, Kenton, Gasley.
Surrey.—Challington, Newdigate, Ockham, Okewood Chapel.
Wales.—Penmachno, Carnarvonshire.
Wilts.—Sherington.
Worcestershire.—Birts Merton.

Thus the work of Mr. Franks cites sixty-six churches containing old stained glass, only two or three of which have been mentioned by Mr. Winton, or included in the Art Inventory. Descriptions of each of these windows are desirable, as Mr. Franks merely draws single panes. It is evident that the remarks which we made as to the large body of information which has to be added to that collected by Mr. Cole, are more than justified, a hundred distinct additions being thus collected from two well-known books alone. As illustrating the history of stained glass, the table we have formed possesses undeniable value. As an exhaustive list of the old stained-glass windows to be found in this country, the information thus arranged from the Art Inventory can only be regarded as rudimentary; but it is a rudiment from which may be hereafter developed a full topographical catalogue of English painted windows; and in that hope we commend it, not only to the perusal, but to the collaboration, of our readers.

It is remarkable that the valuable work of Mr. Franks, referring to so many churches not mentioned by Mr. Winston, appears not to have been consulted by Mr. Cole. It is not included in the "List of Works in Art Library containing Information upon Painted or Stained Glass," which is given in the "Universal Art Inventory," although it is entered in the "Universal Catalogue of Books of Art," with the added letters, "S. K.," denoting that a copy is to be found in the Art Library at South Kensington.

COMPLETION AND PRESERVATION OF ST. PAUL'S.

IT is not to the credit of England, in the matter of æsthetic education, that the metropolitan cathedral should have been allowed to remain unfinished for nearly two hundred years. Still less creditable is the fact that such a statement will be received, by nine persons out of ten, with surprise, if not with incredulity. That such is, however, the plain unvarnished truth, there is no doubt. Grand as is the outline, and careful or even elaborate the external finish, of the exterior of the finest modern Roman building, except one, in the world, the interior yet remains in the state, with few exceptions, at which it arrived when the builder proper had nearly completed his work, and the architectural decorator was about to begin his. Wind-tight and weather-tight, externally not only completed by the architect, but fringed with a stone balustrade, erected in addition to the design, and against the will, of Sir Christopher, the interior of St. Paul's is yet in the essentially temporary state of an unfinished building. The lovely carvings with which the unrivalled skill of Grinling Gibbons enriched the choir contrast with the unrelieved hue of the monotonous stone and plaster. Still more bald,—nay, positively offensive to the eye,—are the square, thickly-leaded panes of the mean glass windows, which, till very recently, have been the sole lights of the place. It is true that this defect is now, to some extent, in the course of rectification. We wish that we could speak with enthusiasm as to the success of the attempt.

An old engraving exists which shows the interior of St. Paul's richly decorated, according, as it is stated, to the design of Sir Christopher Wren. However that may be, there is no doubt that a certain and, indeed, a large amount of decoration is demanded by the very nature of the structure. We cannot compare St. Paul's, classic although we may term its Roman architecture, to those ancient hypæthral temples which owed their grandeur to severity of form and depth of unrelieved shadow. The *basilica*, not the colonnaded *cella*, is the primitive form of a Christian church. Vast, high springing arches, or lofty inclined roofs, have been always required to shelter the thronging worshippers of the northern climates. It has been the habit of the pious, certainly for fourteen centuries, to enrich the interior of churches of Romanesque and Roman design with colour and with gold; and that with a splendour proportionate to the structural importance of the work. In many cases the gleam of coloured marbles, the glitter of gilded bosses, and the rich warmth of painted medallions, burst on the eye of the visitor who enters the church, with a beauty for which the modest severity of the external architecture had not prepared the imagination. Who can forget the splendour of such interiors as that of the Church of the Annunziata at Genoa? The enrichment which in Gothic art is produced by the chisel of the sculptor, in moulding, and foliated capital, and delicately canopied

shrine, is supplied, in Roman structures, by marble, by gold, and by colour. The "dim religious light" of the painted window is essential to the character of each.

It need not be added that the movement on foot for completing the interior decoration of St. Paul's Cathedral is one to which we shall be most happy to contribute afresh all such support as lies in our power. We might have supposed, indeed, that it was only necessary for the great almsgiving public,—which has been stated to subscribe an annual sum so large that we hesitate to write it, to the various religious and benevolent objects of the metropolis,—to be made aware of the want, to find the means for supplying it, but for the failure which attended the first appeal. When, after so secular a slumber, the dignitaries of the Cathedral, and the worshipful authorities of the City, have awakened to the fact that, as regards this well-known Church, they are in fact "poor, and blind, and naked," we cannot believe that it will be long before they remove the stigma from the City.

We wish good speed to those who have taken in hand the completion and adornment of the Cathedral; and, referring to what we have previously said concerning the effect of the operations for the subterranean Metropolitan Railway, we appeal to them, in so doing, to keep—by day and night — a sure watch on the yet more important point of its permanent stability.

PHOTOGRAPHS ILLUSTRATIVE OF THE ARCHÆOLOGY OF ROME.

A SELECTION from the large number of photographs that have been made in Rome, under the direction of Mr. J. H. Parker, is now on view at the German Gallery, Bond-street, and catalogues of the whole are published. Mr. Parker has come to the conviction that the city of Rome was built upon the great earthworks of the primitive fortifications, which have governed the plan of the city, and have had great influence on the sites and plans of the principal buildings. These gigantic earthworks consisted, like other primitive fortifications of scarped cliffs, of terraces and trenches. They are very much obliterated by having been built over for many centuries, but the demolition of these buildings has brought the original work to light in many places, as on the Palatine, where parts of the wall of Romulus, of Etruscan character, and the foundations of his towers, are visible at the north end, opposite to the Capitol. These towers have evidently been left unfinished, and have been built over in the time of the Republic and of the Empire, and in the Middle Ages; but all these buildings being now destroyed, the foundations of the towers are visible, and photographs of them will be found in his series. The wall of Servius Tullius is visible in many places.

The great wall of Aurelian, thirteen miles long and 50 ft. high, with a corridor for the sentinels along the inside of it, is also copiously illustrated in another series of photographs. And the gateways which occur, many turned into fortresses by Honorius, A.D. 400, are also illustrated. The aqueducts for about a mile form part of the wall, and were incorporated in it by Aurelian, as were other buildings, such as the Prætorian Camp, the Sessorium with its amphitheatre, and the Lateran; the remains of the great wall are traced also in the Tiber, and in the Trastevere going up to the Janiculum. These form another series.

The aqueducts have been traced from their mouths to their sources, and there is in the room a remarkable plan of them from the sources to Rome. There are photographs of the numerous bridges, sometimes more than 100 ft. high, across the valleys and gorges in the mountains; then, descending to the "Campagna" round Rome, we have the "Piscinæ" and the arcades, till we arrive again at the walls of Rome. It is shown that one of the finest of the aqueducts, which has been called for the last century or more "Aqua Alexandrina," because it was supposed by Fabretti to have been built by Alexander Severus, is really of the time of Trajan and Hadrian, two centuries earlier. This is proved by the construction of the arcade, and of the walls of the *castella aqua*, or reservoirs, by the side of it. It is also confirmed by an inscription of Hadrian found on the first reservoir near Gabii, by Visconti, in the last century, since the time of Fabretti.

As a chronological series, the photographs are intended to supply a type for each half-century, from the time of the foundation of Rome to the sixteenth century; and they apply to the buildings over the greater part of Europe, as the history of architecture shows that the art of building in stone came from Rome, or through Rome to all the provinces of the Roman empire, and the construction of walls in each century is everywhere the same. This series affords important help towards a real history of architecture, such as no drawings can supply. Few drawings can be relied on as to the absolute proportion of the stones or bricks, or of the mortar in the joints between them; yet these are details which are often the best guide to the age of the building, or at least of the original parts of it, and which enable us also to see the changes that have been made.

The tombs and cemetery chapels, the fresco paintings in the Catacombs (taken with magnesian light), the mosaic pictures in the churches from the fourth century to the fourteenth, are extremely valuable for the history of drawing.

The mosaic pictures with which the churches are decorated date from the time of Constantine, and a large proportion of them are before the tenth century, a period when we have no churches or other buildings in the West. At a later period, the beautiful church furniture of the Cosmati family, their altars and ambones, and Paschal candlesticks and tombs, enriched with their admirable ribbon mosaics, are not to be found out of Italy. Of these there is a fine series of photographs.

Concerning the constructions of walls, Mr. Parker has elsewhere said,—

"For the construction of walls, the brickwork of the time of Nero is the finest in the world. The bricks with which the walls are faced are so thin that we can count ten to the foot, including the mortar. This perfection did not continue long. In the second century there are eight to the foot, in the third century six, and in the fourth century four only, as in modern brick walls. This is a useful general guide to the age of a building in Rome, because the walls frequently remain when all the ornament has been destroyed. The Roman temples of the first century were better than at any other period, but their marble temples were never equal to those of Greece, and some of the largest and finest buildings in Rome belong to the second and third centuries, although their details do not equal, in purity, those of the first. The magnificent thermæ of the Antonines, called after Caracalla, are not equal in the construction of the walls, or in the architectural details, to the thermæ of Titus and the House of Nero; but there can hardly be said to be any perceptible falling off in the buildings of the time of Trajan and Hadrian. Many of the temples were rebuilt by Septimius Severus in the beginning of the third century, and their old names retained, as we are expressly told by the historian of his life; and this is a point always to be considered in examining the Roman temples."

Public bodies,—the British Museum, for example,—ought certainly to become possessed of a set of these photographs, and so aid in an important undertaking. Individuals would find selections of great interest might be made from them. The photographs that have been taken by artificial light in the Catacombs may serve to dispel some illusions as to dates.

LECTURE BY MR. SCOTT ON CHESTER CATHEDRAL.

A CROWDED and enthusiastic meeting in promotion of the restoration of Chester Cathedral, which was held in Liverpool in St. George's-hall, on Tuesday in last week, was followed up, in Chester itself, by a lecture from Mr. G. G. Scott, the architect for the restorations. The lecture was delivered in the fine room which is now called the King's School, and which was formerly the Refectory of the Benedictine Abbey connected with this church. The Dean was in the chair, and made a few prefatory remarks, dwelling especially on the importance of ultimately including the great south transept with the nave and the space under the tower, in one general restoration, so that the whole interior might be seen in its ancient dignity.

Mr. Scott, in opening his lecture, said that unlike the majority of the great Mediæval churches, the origin and date of the foundation of this cathedral were unknown. Chester having been a Roman city, it followed that it must, during the last century of the Roman occupation—when the empire was Christian—have possessed churches, and one might have stood upon this site. The same might be said of the interval between the departure of the Roman legions and the Anglo-Saxon conquest—a period prolonged in this instance through the district which included Chester having been held much longer by the Britons than most parts of England. They were Christians, and must have had churches, and one might have stood here. Whenever founded, the original church was said to have been dedicated to St. Peter and St. Paul; and Mr. Parker conjectured it to have been Romano-British. During the Anglo-Saxon period, however, the dedication of the church was changed from St. Peter and St. Paul to St. Werburga and St. Oswald. This was at least as early as the reign of Athelstan, as he and several later kings are recorded as having paid their devotions at St. Werburga's Church. The lecturer then referred at some length to the personal histories of the Princess, St. Werburge, and St. Oswald, King of Northumbria, as a reason for the change of dedication. A century and a half later we find the church to have become ruined, probably during the second great Danish invasion, and restored or rebuilt during the reign of King Edward the Confessor, by Leofric, the wise and great Earl of Mercia, and the pious Countess Godwina, or Godiva, of famous memory,—the restored English rule thus again doing homage to the memory of their royal English saints; nor, when our country fell once more under foreign domination, was their memory dishonoured; for the first Norman Earl, Hugh Lupus, sister's son to the Conqueror, and his countess, Ermentruda, refounded the church on a far grander scale, converting it from a church of secular canons (just such a collegiate body as now exists) into a Benedictine monastery; and that not at the instigation of the English alone, but of the great foreign ecclesiastic, St. Anselm, then Abbot of Bec, but soon to become Archbishop of Canterbury. Thus we have had in review a long series of kings, princes, and rulers, as well as of royal and noble ladies—century after century—promoting the interests of this church; and we find that this only shared with many others their pious and princely munificence. Yet it is now as much as we can do to get funds to keep the few great churches which remain to us of their great foundations in a state of decent repair!

Not only was it customary with the Normans while dealing with the ecclesiastical structures of their predecessors, to make a clean sweep and reconstruct them on a greatly enlarged scale, but the change from a comparatively small collegiate institution to a great monastery of necessity involved this. It is, therefore, not to be wondered at that no vestige of the older buildings remain. Our architectural investigation must consequently commence with the new foundation begun by Hugh Lupus about 1195. The previous church, if only a restoration of the older Saxon church, was probably of no great dimensions. The surviving portions of Norman work, especially in the north transept, were next described. About 1195 the eastern parts of the building appear to have been much dilapidated, and appeal for help was made by the monks in a lugubrious tone. An interesting period followed, marked by the frequent presence of King Edward I. in Chester, when grants of venison from the forests of Wirrall and Delamere were made to the workmen who were carrying on the work of construction, under the vigorous rule of the Abbot Simon of Whitchurch. One of the most attractive parts of the lecture consisted in the description given of the methods by which the true forms of buttresses and cornices, and especially of the singular terminations of the south aisle of the choir, had been discovered by the help of fragments disinterred in the process of reconstruction.

Towards the close, Mr. Scott said,—You will have gathered, from what I have narrated, that your cathedral, though its beauty is now so sadly dimmed by decay and barbarous repairs, is a building of great architectural merit, and of great antiquarian value. I will add, that few of our cathedrals exhibit a more complete consecutive series of specimens of the different varieties and chronological phases of our Mediæval architecture, from the Norman conquest to the Reformation. Of the earliest Norman we have a specimen in the north transept. Of the middle Norman we have the remains in the north-western tower and the substructure of the abbot's hall, with, perhaps, the recesses for tombs in the north wall towards the cloister; of yet later Norman, we have the passage from the

abbot's house to the cloister, with the chapel above it; and later still the doorway from the eastern cloister into the nave. Of the transitional style from Norman to early English, we have the eastern chapel of the north transept, now the vestry; also some beautiful fragments lately discovered. Of the fully-developed early English, we have the chapter-house, with its vestibule, as beautiful works as could well be produced. We have also the beautiful refectory of the monks in which we are now assembled, and which contains one of those exquisite pulpits—such as we find at Beaulieu, at Shrewsbury, at St. Martin aux Champs at Paris, and in many other monasteries. Of the transition from early English to the Middle Pointed or Decorated style, we have the Lady Chapel; of the somewhat more advanced decorated, we have the two eastern bays of the choir aisles, with a further advance in their western bays and the clearstory. Of the later decorated, we have a truly magnificent example in the south transept, and smaller ones in the substratum of St. Werburg's shrine, the sedilia, and the choir-screen. Of the early Perpendicular, I should have thought that we had specimens in the clearstories of the south transept of the eastern bay of the nave; of the more advanced style, in the central tower, and in the stallwork of the choir; of the latest phase, in the west end, and probably in the clearstory of the nave. The cloisters also belong to one of these two last phases. Thus we should have the whole series of changes which the middle ages produced represented in this one cathedral—all alike, however, clouded by decay, and all crying equally loudly for restoration. It is for you to respond to that cry, and to render this, the great central temple of God in your diocese, worthy at once of its sacred uses, of its rank, as the great diocesan church, and of the importance of the diocese, including, as it does, some of the most princely residences of the nobility, and the greatest mercantile emporium of the greatest commercial country in the world. The church has come down to our day—what with decay and barbarous repairs—a mere wreck of what it once was—a melancholy relic of former ages, and a reproach to our own. It is for you to do honour at once to the past and the present, by liberally aiding your most excellent and zealous dean in effecting its proper restoration.

After a vote of thanks had been given to the lecturer, the company followed him from the King's School to the Chapter-house, where he commenced to point out in detail those features in the cathedral to which he had referred in his lecture. The Chapter-house he regarded as one of the most beautiful rooms of the thirteenth century. Its exact age was not known; probably it might be placed in the latter quarter of that century. In its predecessor many of the abbots, including the famous Whitchurch, were buried, but what became of their tombs he could not say. He thought it probable that the light of the western window was borrowed, and that at one time the monks' dormitory came up to it. Passing to the north transept, he called attention to the veritable work of Hugh Lupus, which was to be seen in the arcade over the head of the arch. From the eastern side, up to the end of the twelfth century, projected an apsidal chapel, and the outline of the arch by which that was entered has been disclosed by the taking off of the plaster. The piscina was not earlier than 1190 or 1200. Passing through the vestry, where the details of the Norman arch were more clearly disclosed, Mr. Scott then led the way to the outside of the north aisle, where he called attention to the base of one of the enormous buttresses, then to the corner of the Lady Chapel, where the lighter buttresses were found which gave the true position of the windows and the direction of the mullions. On the south side of the Lady Chapel he called attention to the pierced parapet and toothed ornament, discovered when the roof was removed, and also pointed out the arch above the end of the south aisle, which bore a spire, and the aisle, about being constructed in an apsidal form. Farther on he noticed the sloping form of the buttresses, and a doorway which the Dean said was used as an entrance to the choir at one time by the Benedictine monks, the tomb of the author of the "Polychronicon" being near it. The Lecturer passed on to the south transept, then into St. Oswald's Church, where he spoke of the chapels of St. Nicholas and Mary Magdalen, and pointed to the sedilia of the former. From thence the route was into the south aisle, through the choir, to the end of the north aisle, but not into the Lady Chapel, then back to the choir, and through the nave to the westward, and into the Norman tower; but here, we believe, the perambulation ended, as it was near five o'clock, the time for evening prayers.

ART-UNION OF LONDON.

THE following is a list of the principal works selected by prizeholders to this date:—

From the Royal Academy.—"Move Eastward, happy Earth," &c., C. J. Lewis, 150*l.*; Henry II. and Diana of Poitiers, A. H. Tourrier, 150*l.*; The Village Violinist, E. Opie, 50*l.*; A Mountain Stream, Aber, North Wales, J. Taylor, 50*l.*; Near Bethesda, North Wales, F. Williamson, 20*l.*

From the Society of British Artists.—The Stile, W. Bromley, 60*l.*; River Rance, Dinan, Brittany, F. T. Lott, 50*l.*; Ennui, T. Davidson, 42*l.*; A Jersey Interior, W. A. Atkinson, 40*l.*; The Forsaken Nest, J. C. Waite, 40*l.*; The Lledr, J. Peel, 35*l.*; Temple Weir on the Thames, A. A. Glendening, 30*l.*; Rhayadr Du Falls, Dolgelly, H. P. Powell, 30*l.*; Fishing Village, Coast of Normandy, J. J. Wilson, 30*l.*; Life and Still Life, C. T. Bale, 25*l.*; A Mountain Stream, North Wales, A. Barland, 25*l.*; The Thames at Wargrave, G. S. Walters, 25*l.*; Scarborough, A. Clint, 25*l.*; Flirting, C. Armytage, 21*l.*; The Path by the Loch, A. A. Glendening, 20*l.*; Evening on the Wye, F. Muschamp, 20*l.*; Evening, C. L. Coppard, 17*l.*; Waterfall at Loch Eck, on the Clyde, J. Burbidge, 15*l.* 15*s.*; Tired from the Glean, Mrs. Backhouse, 15*l.*; The Resting Place, E. Holmes, 15*l.*

From the Royal Scottish Academy.—Shichallion—Sabbath Morning, S. Edmonston, 30*l.*; a Fortune in a Teacup, J. C. Waite, 27*l.* 10*s.*

From the New British Institution.—The Jungfrau, from the Road to Mürren, S. Hodges, 100*l.*; Blue Bells, H. Wallis, 70*l.*; Ophelia, H. Selou, 42*l.*; Glen Etive, near Glencoe, J. Docherty, 4*l.*; "Not Enough," A. T. V. Bail, 30*l.*; Girl and Thrush, A. F. Patten, 30*l.*; Moonlight on the Coast, A. Gilbert, 20*l.*

From the Society of Painters in Water Colours.—The Rialto, Venice, W. Callow, 50*l.*; Isola Bella, &c., C. Smith, 45*l.*; Bay of Naples, E. A. Goodall, 31*l.* 10*s.*; Amongst the Apple Trees, J. J. Jenkins, 30*l.*; Primrose-gathering, P. J. Naftel, 25*l.*

From the Institute of Painters in Water Colours.—Limburg, with the Cathedral of St. George on the Lahn, E. Richardson, 94*l.* 10*s.*; On the Avon, at South Brent, Devon, J. H. Mole, 50*l.*; From the Capo-di-Monte, Naples, T. L. Rowbotham, 25*l.*; At Chilstom, near Torquay, John Chase, 15*l.* 15*s.*

From the General Exhibition of Water Colour Drawings.—The Awakened Conscience, J. Hayllar, 40*l.*; Moelgead, Portmadoc, North Wales, J. Needham, 15*l.* 15*s.*; "Waiting, Watching, Hoping still," J. C. Russell, 15*l.*; The Winner Won, Ellen Thornycroft, 15*l.*

From the Old Bond-street Gallery.—Flushing Boats fishing—Boats running into Harbour, T. S. Robins, 31*l.* 10*s.*; On the Moor above Cladich—Loch Awe, J. J. Bannatyne, 25*l.*

ON THE CHEMISTRY OF POTABLE WATERS.*

IT is not my intention to give an account of the functions performed by water as a physical agent; of the wonderful changes it has worked and is working upon the face of the globe; of its power as a transporting agent; nor, indeed, of the manifold purposes to which it is turned into usefulness by the ingenuity of human intellect. Yet, as a reservoir, as a store, as a source of power, I may just mention that we possess an immensity in our tidal rivers and around our coasts, which as yet is almost undreamed of in our philosophy; its magnitude is such that when viewed side by side with all the combined steam power of Britain, the latter appears insignificant and microscopic; and in the hands of a Wellington in science greater changes by far may be effected from this source than from the steam of Watt and of Stephenson. But I will lay before you some of the leading characteristics of water as employed for sanitary purposes, such as they occur to me; will point out their impurities, their source and mode of detection, examination, and possible estimation.

Passing over the modes in which chemists formerly examined water, I come to the

Nitrogen, Carbon, and Ammonia Methods.

In the present day, I believe, there are only two methods of approximately determining the value of domestic water. The first is known as Frankland & Armstrong's gasometric system, and the second as Wanklyn, Chapman, & Miles Smith's ammonia system. Between each set of inventors there exists great rivalry, each insisting upon the accuracy of their system to the detriment of the other. Of this rivalry I will merely note my belief that, *theoretically*, Frankland's process is as perfect as any process is ever likely to approach; while, in practice, Wanklyn's ammonia method is much to be preferred. This being so, I shall give you a brief outline of the gasometric mode of Frankland, and then proceed to a more detailed and illustrated account of that of Wanklyn, premising that the results are such as I have myself personally obtained.

Frankland & Armstrong's Gasometric Process for the Analysis of Organic Matter in Water.

These chemists endeavour to show, not the actual weight of organic matter present in a given bulk of water, but that of some of its constituents, and also some of the products of decomposed organic matter, which latter is termed by Frankland "the skeleton of sewage." First, the organic carbon and the organic nitrogen. These are converted into gas, and measured as carbonic acid and as nitric oxide. Second, the nitrates and nitrites; and, lastly, the ammonia. By this means the whole of the nitrogen contained in the water is valued, and a distinct estimate is made of the nitrogen rendered harmless by oxidation, and of that which yet exists as putrescible organic matter.

The first operation is to evaporate a known bulk of water to dryness with a prior addition of sulphurous acid, to expel all carbonic acid from carbonates, and also to destroy the nitrates and nitrites; the residue now contains the whole of the nitrogen of the organic matter and the nitrogen of the ammoniacal salts; and by making a separate estimation of the latter,—through the Nessler test, to be hereafter described,—and subtracting this from the total nitrogen obtained, we arrive at that corresponding to the organic nitrogen.

The process by which these determinations are made somewhat resemble the combustions in organic analyses, but are much more complicated, and require greater delicacy of manipulation.

As an indication to the limits of this test, it is stated by Frankland that the $\frac{1}{23000}$ part of a grain of nitrogen and the $\frac{1}{100000}$ part of a grain of carbon can with certainty be determined.

I shall not enlarge upon their mode of estimating the quantity of nitric acid; I have already indicated it is done as nitric oxide and the volume of gas measured off.

But I must draw your attention to a characteristic point in all the analyses of waters by Frankland, and notably indicated in the recent report of the Royal Commission for Rivers Pollution, and in the examination of the metropolitan waters.

I refer to "the previous sewage contamination" column of such analyses. This question is a moot point with chemists, some considering it almost a worthless indication, and others insisting upon its great value in deciding the relative goodness or badness of potable water.

For my own part, I incline to think it as a somewhat vague term, and calculated to mislead the public, not as being worthless in its indications, but as really showing too little.

By the term "previous sewage contamination" would generally be implied the actual quantity of sewage with which a water was, or had been, contaminated at the period of its examination; but such is not the case, as I read Frankland's definition of the term, which, expressed in a few words, means the actual present amount of the *skeletons* of sewage,—of that which *was*, and has no reference to that which is at the present moment active and living sewage!

From which it follows that, probably, a water may contain variable quantities of sewage, and yet, according to the "sewage contamination" column of Frankland, no return would be made, and, by inference, that no sewage was present. That this is so, I may mention, a certain water was examined repeatedly by me, at intervals—which said water shall be nameless—and I always found indications of sewage matter; and, on turning for verification to Frankland's sewage contamination column, in his analysis of the same water, I found that *no* previous sewage was present. Now, this may be considered as either discouraging or encouraging, as viewed from opposite motives; and yet it is easily explained from the fact of my showing active and putrescent sewage, or analogous matter, whereas Frankland's column merely shows that which was ancient sewage, but is now no longer sewage. And for this, as one ground of objection, I must protest against the term, "previous sewage contamination," as being vague and delusive.

We now arrive at the method devised by Professors Wanklyn, Chapman, and Smith for determining the organic matter in water by

The Ammonia System.

Coupled with this, I shall introduce you, somewhat briefly, to a general system of water analysis, as suggested by these gentlemen, premising that much of it is obtained from older methods, now broken up and partly re-absorbed

* By Mr. Richard Weaver, C.E.

in modern systems. I divide the course into six divisions, as follow:—

1st. Hardness.
2nd. Chlorine.
3rd. Total residue and loss on ignition.
4th. Nitrates and nitrites.
5th. Ammonia.
6th. Organic matter.

Hardness.

The hardness of water has reference to its soap-destroying powers, and is caused by the oxides of calcium, magnesium, and iron, combining with the fatty acids of the soap forming insoluble salts; and, so long as any of the earths remain in solution, the soap cannot exercise a detergent action: hence the value of soft water for cleansing purposes. This which I now hold before you is a solution of soap in aqueous spirits of wine, and is standardised by a somewhat tedious process to an equivalent of 16 grains of calcic carbonate per gallon of water; or, in other words, corresponds to 16 degrees of hardness, and with 1,000 grains of water of such hardness, 32 test measures, or 320 grains of soap solution, will just neutralise, and cause a lather to form, on thoroughly agitating, and will last about five minutes.

Upon such a water I now operate, and note the result.

Chlorine.

The reason is for determining chlorine in a potable water that it points to a possible origin in sewage, for no sewage can exist in water without chlorides being present, sewage being rich in chlorine, especially from the urine. Yet, on the other hand, chlorine may very probably be present without any sewage, and it becomes a problem whether its source is due to sewage or to the geological character of the strata through which the water may have flowed.

The determination of the quantity of chlorine is very simple, and yet wonderfully accurate.

We first prepare a solution of argentic nitrate in pure distilled water, and to a known strength. To the water under examination we add a few drops of neutral potassic chromate, and then the silver nitrate,—as in the experiment now before you,—until a faint tinge of reddish coloured silver chromate denotes the end of the chlorine reaction; and from the amount of silver solution employed we estimate the chlorine.

Total Solid Residue, &c.

For this experiment it is essential that the quantity of water employed shall be very accurately measured, and that a delicate balance is at command, because each millegram—about $\frac{1}{65}$ part of a grain—of residue is equivalent to 1 grain per gallon of water.

The apparatus which is usually employed for the purpose of estimating the total solid matter contained in a water consists of a small copper or tinned vessel for generating steam. Through the mouth of the vessel passes a perforated cork, and again a large glass funnel; into this latter is arranged an accurately weighed platinum dish. We now take 70 cubic centimeters of the water under examination, and place it in the platinum dish; steam, being generated in the lower apparatus, rises through the funnel, and, acting upon the platinum dish, the water contained therein is quickly evaporated—in fact, in practice, I find that about forty-five minutes are amply sufficient time for the purpose. The dish and its contents being now well dried and weighed, the excess of weight over the first weighing represents the amount of solid residue. If it is further desirable to ascertain the amount of loss on ignition, we carefully burn off all carbonaceous matter, at a faint red heat. Moisten with ammonia carbonate, well dry, re-weigh, and the difference represents the volatile matter. This process, as previously stated, is of very little value in estimating the character of water.

Nitrates and Nitrites.

These are the skeletons of Frankland's sewage, and the mode by which their quantity is determined is exceedingly elegant.

We take a retort, and introduce 100 c. c. of water, to this add 60 c. c. of caustic soda solution free from nitrates, &c. The contents are now distilled until about 100 c. c. remain within the retort, and until the Nessler test is incapable of showing ammonia. Into the retort on cooling is added a small piece of the metal aluminium; it is closed with a cork, through which passes a small tube in the manner I now show you; it is filled with pieces of broken-up tobacco-pipe, or analogous matter, and moistened with dilute chlorhydric acid. On standing for a few hours, the action is complete; the whole of the nitrates have been resolved into ammonia, and the ammonia, being distilled off, its quantity is determined by the Nessler test.

The process is so exceedingly delicate that it may be termed microscopic; indeed, a very small fraction of a grain of nitrates per gallon being readily ascertained. As to the relative value of the nitrates in a water in determining its quality, there is much difference in opinion, some chemists allowing that considerable quantities may be permitted without detriment, whereas Frankland would probably condemn a water if even a gallon contained but half a grain of nitrates!

Ammonia.

The estimation of ammonia in water may fairly be considered to belong to the domain of microscopic chemistry when the Nessler test is employed.

I will first describe this test. We dissolve 50 grammes of potassic iodide in a little hot distilled water, placing the dish in a water-bath, and adding a strong solution of bichloride of mercury. We continue the mercury solution until a point is reached at which the red precipitate formed no longer dissolves on agitation. We then filter, and to the filtrate add 150 grammes of solid caustic soda in aqueous solution, and then dilute the whole to the volume of 1 litre. A further addition of about 5 c. c. of mercuric chloride imparts sensitiveness. Allowing all sediment to settle, and pouring off the clear fluid, we have the Nessler reagent such as I now show to you.

If we take a water containing a trace of ammonia, and add the test, we obtain a yellowish brown colouration; and according to the intensity of this colour we calculate the amount of ammonia present.

We have now arrived at a stage in water analysis when we determine the presence of matters that are of prime importance in judging of quality; that is, the ammonia and the urea, and it is astonishing the minute difference in quantity which marks the point between waters that are foul and stinking, and waters that are good and wholesome.

The Albuminous Substances.

The most important of all the substances to be sought for in water intended for domestic purposes, is undoubtedly the nitrogenous organic or albuminous matter, and it is primarily by this test we judge of the antecedents of water, and the character and source of its contamination. It is simple and elegant.

To the remnants of the last experiment we add a strongly alkaline solution of potassic permanganate, and distil off not less than 200 c. c., and until Nessler ceases to show the presence of ammonia; for you must understand that the action of the permanganate is to cause most of the nitrogen from the organic nitrogenous matter—not nitrates—to be evolved as ammonia, and by estimating the quantity of this we have a fair idea of the quantity of organic matter on multiplying the result by ten.

The delicacy of these tests is truly wonderful, for we can directly estimate ammonia in water when its weight does not exceed the $\frac{1}{10000000}$ part of the water in which it is dissolved; and when we concentrate by evaporation or distillation, we increase its delicacy *at least* ten fold. We have now arrived at the end of our chemical examination of potable waters, and I will just add a few works as the characteristics of really good water.

It should be clear, colourless, and transparent when viewed through a considerable stratum; it should be perfectly free from smell, both at the ordinary temperature and when heated to about 90° Fahr. It is well also if a little lime or baryta water be added previously to warming; its hardness must not be excessive, and, above all other considerations, it must be free from sewage matter. This is of vital importance, for we have it on record for years past, and, in fact, there is not a summer or an autumn comes without hundreds of human beings that are carried away to an early grave from the use of water polluted with sewage; and excepting in the very vilest of waters, its presence cannot be detected excepting by competent chemical examination, for it is an ascertained fact that waters which are clear and fair to look upon, that are beautiful and sparkling to the eye, may, nevertheless, be veritable poison-cups.

Before closing, something will possibly be expected upon the second phase of water—that is, sewage. Much has been said and written upon this subject of late years; but very little has been accomplished towards solving the problem of what shall we do with our towns' sewage, as you are aware there are at this present moment three systems in vogue; viz.:—

Deodorisation with disinfection, of which the ferric chloride process is a type.

Secondly, the precipitation process, by which a portion of the mechanically-suspended matter in sewage is thrown down, of which the lime, the alum, the clay, and Sillar's processes may be given as types. In this class are attempted to be accomplished the objects of the first, and also to derive a profitable manure; and I scarcely need remind you that they generally fail in the first object, and some of them in the second.

Thirdly, deodorisation disinfection, and a profit is endeavoured to be attained by the irrigation of land with sewage. This is a very ancient mode; indeed, it appears to be coeval with man. Like everything else, chemists and others differ as to whether this system of treatment is really efficient, some contending that the effluent water flowing from off the land, after its functions are here ended, is not in a much better condition than when it was turned on. Now, this objection seems to me, after some years' consideration of the subject, observation in various parts of the world, and a trifle of experiment, to be a very futile objection; for it is evident, upon reflection, that a sufficiency of filtration through, and not over, porous soil has not been attained; for, I take it, the absorbent power of soil will not be called in question, or what is the use of manure?—it must needs be washed away by the first smart shower. There are others—for example, the Rivers Pollution Commissioners—who contend, and I go with them a long way, that the water, as a rule, flows away remarkably pure, deprived of 90 per cent. of its impurities—the amount I give from memory—and this, you will understand, is in practice; but I go further, and contend that 99 per cent. should be removed, being, however, fully aware that greater filtration is requisite,—not ordinary filtration, but that through land, nature's grand disinfectant.

There is, however, another objection to irrigation, viz., that a nuisance and probable danger are created by putting sewage upon land in the first instance; that is, the sewage being in an active stage of decomposition on arriving at the place of absorption by the soil, the gases of decomposition are diffused through the air at all points between the places of absorption and first contact with the open air. This I conceive to be a feasible objection, within certain limits, upon these grounds:—It is a condition of all matter to undergo decay and change through decomposition; it is thus with sewage, especially animal sewage,—a medium between that which was and that which will become life. Under certain conditions, especially of temperature, this decomposition is actively promoted; and I concede that from some causes,—either of distance or of time,—a sufficiency of decomposition may have been attained to create a nuisance and a danger at the points of distribution of the sewage in question. Now, this is a condition I have long foreseen may probably arise, and have from some attention and a little experiment endeavoured to contribute my mite towards the knowledge tending to a solution of the problem.

I need not give you any details of all the schemes that entered my mind and were developed by experiment: suffice it that that which I found the most successful was chlorine, another was oxygen, but I will now only trouble you with the former. This from limited experiment I find to answer the required purpose; it acts instantly upon the organic matter of sewage; upon that in a putrescent state, the gases are fixed or decomposed, ammoniacal salts are secured in the water, deodorisation and disinfection are so effected that after a lapse of even weeks not a trace of unpleasant odour is perceived, and when this sewage is freed from suspended matter you cannot from mere external evidence tell it from the finest potable water.

The process I propose is something after this manner: chlorine to be generated by the perpetual regeneration scheme of Walter Weldon, in which chlorine is obtained from chlorhydric acid through the agency of manganic oxide, the same oxide being used over and over again for hundreds of times; so that the expense is reduced to that of the chlorhydric acid, the labour, and wear and tear of plant; and you are aware this acid is cheap enough, being a waste product of the alkali works, and can be purchased in a concentrated state at 40s. or 50s. per ton,—

a sufficiency, I believe, to treat millions of gallons of sewage.

I shall now conclude this exhaustive lecture,—that is, exhaustive of your patience and good-nature—not the subjects, for of these it is a mere outline,—and give you some idea of the value of sewage, from a calculation I made recently, based upon an average of fifty samples of Leicester sewage. The value of the ammonia alone in a year's flow, if placed upon the market and sold at current rates, would realise very nearly 40,000*l.*; and this substance, although by far the most valuable constituent, is not the only one, for we have the phosphates, and the alkalies and others; and you will agree with me that there could be no honour too great for the State to confer upon that man who shall effectually solve this problem of utilisation of waste, although I do not believe it will ever fall to the lot of any individual to achieve undivided success, but will rather burst forth spontaneously from many minds, and will attain success, as have all the great events of modern days,—like our railways, our steamers, and our electricity.

FILTRATION OF TOWN SEWAGE.

THE new Royal Commission, appointed in 1868 to inquire into the best means of preventing the pollution of rivers, took up the subject where the former Commission had left it,—that is, after the Thames, the Lea, and the Aire and Calder basins had been reported upon, and have now issued their report on the Mersey and Ribble basins. They come to the same conclusions as the former Commission did in respect of the irrigation of land with town sewage being the best means of preventing the pollution of rivers with it, as well as being the most profitable in application; but they state the case in a different way to that in which the former Commission put it. They say that sewage may be sufficiently purified to be allowed to flow into any river or other watercourse, from which it is not intended to take water for domestic use, by *filtration* through sand or porous soil, as distinguished from the view that some persons take of irrigation, which is, that the sewage is purified by running over the surface of the land in a thin sheet, parting with some of its manurial elements to the plants, and storing the remainder in the top soil for the use of the next crop, or rather for the use of the crop first sown after re-ploughing the land; whereas the present Commissioners say that it is the filtration through a sufficient thickness of sand or porous soil that constitutes the efficiency of this method of utilising sewage; and that, therefore, its purification is insured by passing it through constructed filter-beds equally well as by passing it through the natural soil of the land. This they have ascertained by experiments with several kinds of soil, with sand, and with sand mixed with coarsely powdered chalk. The difference between filtration through constructed filter-beds and through the soil of the land is one not of efficiency of purification, but of the profitable application of the sewage, the former method being unremunerative, while the latter is remunerative. But it is consolatory to know that in places where land cannot be had for irrigation, the sewage may yet be sufficiently purified to be allowed to flow into rivers, although the value of the solid part of the sewage which is retained may not be of much value. The value of it will evidently depend on the quickness with which it can be extracted in respect of the length of the time elapsing from its entry into the sewers to its extraction at the outfall. Where the gradients are considerable, and the mean distance of the outfall from the town is not very great, it may be arrested in a fresh state; and, mixed with street sweepings and other town refuse, may become of considerable value; while, where the gradients are slight, and the outfall at a greater mean distance from the town, it may become so far decomposed in its transit as to be of no value as a manure.

The Commissioners estimate that for a town where water-closets are in general use (therefore requiring a larger area than would be required where they are not so numerous), 5 acres of filtering surface, and a depth of material of 6 ft., are sufficient for a population of 10,000. According to their experiments, something of this depends upon the nature of the soil or other material used for the filter-bed, the qualities of various soils for this purpose differing; for while soil procured from Dursley, in Gloucestershire, purified sewage at the rate of 9·9 gallons per cubic yard per day, soil from Hambrook, near Bristol, did not satisfactorily purify more than 4·4 gallons per day per cubic yard. Again, soil from Beddington purified sewage of the same strength at the rate of 7·6 gallons per day, while that from Barking did not purify it at a greater rate than 3·8 gallons, or peat from Leyland Moss, near Preston, at a greater rate than 4 gallons per day per cubic yard of material.

Considering that "filtration" has already often been employed to purify sewage, and has always hitherto failed, it is rather startling to see it so confidently recommended, until we remember that both the methods of filtration that have failed for sewage also failed for water many years ago; that is to say, the horizontal method and the upward method, while, as soon as the late Mr. James Simpson rearranged the filter-beds of the Chelsea Waterworks at Thames Bank many years ago, and made the water to descend instead of ascend through the filtering medium, the question was then and thereafter settled as to whether water should be filtered upwards or downwards. Every engineer since that time,—every engineer, that is to say, who has had the knowledge to perceive the difference between a true and scientific and a false and empirical method, or who has had the honesty to acknowledge that he was not the inventor of the practice he has adopted,—all these men have adopted the downward system of filtration of water. And so we find the Commissioners—or, shall we rather say, Dr. Frankland, one of them?—condemning the system of upward filtration now in practice at Ealing, and giving the reason why downward filtration is so effective in purifying sewage. The system at Ealing is to force the sewage upwards through a filtering medium constantly, thereby effecting no proper purification at all; but by making the sewage to descend for six or twelve hours through one bed, then shutting it off from that bed, or compartment, and turning it on to another for a like space of time, and so alternately, the descent of the sewage through the interstices of the material on either bed is followed by atmospheric air; the air, that is to say, that occupied these interstices before the sewage began to descend, and has been used up in oxidising and transforming, and therefore purifying, the former quantum of sewage, is replenished after the descent of each quantum of sewage through each bed, and so by continual periodical renewals of the proper aëration of the filtering medium it becomes a constant purifier of the sewage; for, although this method of filtration in the case of water has mostly been called a mechanical one only, yet in the case of sewage filtration, the same method is said by the Commissioners to be both mechanical and chemical.

In order that there should be no ambiguity about what they recommend, and its attainment, they give a standard of impurity beyond which they think the water of sewage ought not to be admitted into rivers or other watercourses. They suggest that the following liquids be deemed polluting and inadmissible into any stream:—

"Any liquid containing, *in suspension*, more than 3 parts by weight of dry mineral matter, or 1 part by weight of dry organic matter in 100,000 parts by weight of the liquid.

Any liquid containing, *in solution*, more than 2 parts by weight of organic carbon, or ·3 part by weight of organic nitrogen, in 100,000 parts by weight.

Any liquid which shall exhibit by daylight a distinct colour when a stratum of it, 1 in. deep, is placed in a white porcelain or earthenware vessel."

So far the standard is applicable to any town. But the Commissioners, having before them the question primarily of the pollution of the rivers Mersey and Ribble, which traverse the manufacturing part of the county of Lancaster, found it necessary for that district to prohibit,—suggest, rather, that they should be prohibited,—many kinds of pollution peculiar to the manufactures of those parts, *e.g.*:—

"Any liquid which contains, *in solution*, in 100,000 parts by weight, more than 2 parts by weight of any metal except calcium, magnesium, potassium, and sodium.

Any liquid which contains, whether *in solution or suspension*, in chemical combination or otherwise, more than ·05 part by weight of arsenic.

Any liquid which, after acidification with sulphuric acid, contains, in 100,000 parts by weight, more than 1 part by weight of free chlorine.

Any liquid which contains, in 100,000 parts by weight, more than 1 part by weight of sulphur, in the condition either of sulphuretted hydrogen or of a soluble sulphuret.

Any liquid possessing an acidity greater than that which is produced by adding 2 parts by weight of real muriatic acid to 1,000 parts by weight of distilled water.

Any liquid possessing an alkalinity greater than that produced by adding one part by weight of dry caustic soda to 1,000 parts by weight of distilled water."

The opinion of the former Commission was that sewage could not be filtered. "As applied to sewage, disinfectants do not disinfect, and filter-beds do not filter," they said. Sewage applied constantly to a filter-bed on the upward system does not purify sewage continually, certainly; and if that was the system meant to be understood, the former Commission were clearly right in their statement, but on the downward system the case is different. Any one who remembers the condition of the Thames when the Lambeth Company took their water from a point of the river near Hungerford Bridge, and when the Chelsea Company took their supply from Thames Bank, may well compare the water then taken from the river for the supply of a large part of London with the town sewage of to-day. The reports of the engineers were constantly that the water was "turbid;" but that word, as now used sometimes to define the condition of the Thames water, conveys no idea of the state of the water at that time. In comparison with the turbidity now sometimes said to exist, it might be called pea-soupy, or sludgy, and yet this very foul water was passed through filter-beds on the banks of the river, after subsidence in reservoirs, and transformed into the brightest and most pellucid water, as drawn from the filtered water-well. No doubt the surface of the filter-beds often required cleaning; the mud deposited soon stopped up the pores of the sand so that no more water would pass, and this necessity of frequent shutting off and turning on of the water may have been the cause, as illustrated by the view the present Commission take of the subject, why these filter-beds were so perfect in action under such difficult circumstances; the air filling the interstices of the filtering medium—sand and gravel—after the mud was scraped from the surface of the sand, was replenished at short intervals, and so kept the filter-bed continually perfect.

Manchester being within the watershed of the river basin inquired into by the Commission, it became necessary for them to institute an inquiry into the merits of the privy and ash-pit system, as against the water-closet system, especially as that city is the great stronghold of this first-named system.

Agreeing with every other impartial inquiry into this subject, the present Commission condemn it. They illustrate the case in a remarkable way. They suppose all dwelling-houses, warehouses, &c., to be removed, and only the privies left—nearly 60,000 of them in Manchester and Salford—rows and streets, and crowds of them—scattered about almost as thickly in places as the heaps of manure upon a field that has just received a dressing from the dung-cart—each heap here, however, no mere barrow-load once a year, but a constant collection and continual soakage of filth, which has for years been polluting every corner to which air or water could have access. *Is this the site on which to build a healthy town?* Would it not be the first desire of every sensible man to sweep this filth away, to drain and aërate, and, if possible, to sweeten this land before a single dwelling-house should be built?

On the great question of establishing a River Conservancy Board, the present Commissioners agree with the recommendations of the former Commission, to the effect that it is highly desirable that such a Board should be established for every river basin; but on the *secondary* question of how and of whom it should be constituted, the chairman, Sir W. Denison, does not agree with his colleagues, Dr. Frankland and Mr. John Chalmers Morton, and on that subject they give separate reports. The chairman advises a parochial system; that the officers of such parishes as the stream flows through should be the persons responsible for the state of the river flowing through their respective districts, but, anticipating abuse of the powers placed in their hands, he recommends that they be made sufficiently responsible to the general government to enable the latter to check or prevent any such abuse, or to notice and reprove, and even to punish, all negligence or unfairness in the mode of action of the former. "The initiation

of action is to be the complaint of neighbour against the conduct of neighbour.

Let us take a supposititious case, and inquire how this would be likely to work in practice. Suppose two of the uppermost mills or towns on a stream to use the water that comes to them with satisfaction to themselves, but that one or both of them foul it so as to be unsatisfactory to the third person or town, the one below them Of whom is the third party to complain? And of course, the difficulty is increased if three or more parties are satisfied, and the fourth or fifth complains. The boundary of the district over which each parochial Board is to have jurisdiction being coterminous with that of the parish, how are the officers of the parish injured to determine who above them has caused the injury? If all are complained against, who shall determine the degree in which each has contributed to the pollution of the river?

Dr. Frankland and Mr. Morton recommend that, inasmuch as there exist at present no local bodies competent to deal with questions connected with efficient river conservancy, capable of detecting pollutions and enforcing remedies, it will be necessary to call into action an authority possessing greater capacities and powers than those of the existing corporate bodies or local boards. The duties of this authority would be of two distinct kinds: the one would be those of a river police, employed in the detection of offences, and in obtaining the conviction of offenders; the other would include the investigation of and decision upon various works connected with rivers, proposed by either towns or individuals, such as schemes for water supply and for the defecation, filtration, or utilisation of sewage and other polluting matters, while local boards could obtain information on these points only from persons capable of investigating them. Nevertheless, under the second division of the duties of the central authority, the co-operation of the local corporations would be required for the efficient discharge of them. Indeed, if guided and assisted by a properly qualified central court, the present local boards would be quite competent to meet all local difficulties and to supply all local wants. A central authority would not extinguish the corporations and local boards at present existing in the river basins. It would, the Commissioners believe, materially promote the energy of local action by removing the obstacles which at present hamper it, and by giving a prompt decision to the questions which it has to solve.

SOMETHING ABOUT HIGHGATE.

MR. WILLIAM HOWITT, the author of many delightful works, has given, in his recent book, reviewed in these columns when it first appeared, particulars respecting Highgate.* From the top of the house he occupied there he could see the vast mass of all-devouring London spreading itself and ever increasing on all sides. Long after the Norman Conquest all this was the quiet Forest of Middlesex; for Fitz Stephen (c. 1175) thus describes its suburbs:—

"There are cornfields, pastures, and delightful meadows, intermixed with pleasant streams, on which stands many a mill, whose clack is grateful to the ear. Beyond them a forest extends itself, beautiful with woods and groves, and full of the lairs and coverts of beasts and game, stags, bucks, boars, and wild bulls. These wild bulls were probably buffaloes, or like the beasts of Andalusia, in Spain, which, I presume, are small." They were more probably like the celebrated cattle at Chartley and Chillingham (Northumberland). The forest was full of yews, which supplied the bows for the warriors of Cressy and Agincourt. It was disafforested in 1218, in the reign of Henry III. At this time, we must remember, that the whole population of England was only about 2,150,000. In 1377 London only had 35,000 people. Henry VIII. made a proclamation that as he was "desirous to have the game of hare, partridge, pheasant, and heron preserved in and about his honor, att his Palace of Westminster, for his own disport and pastime; that is to saye, from his said Palace of Westminster to St. Giles-in-the-Fields, and from thence to Islington, to our Lady of the Oke, to Highgate, to Hornsey Park, to Hampstead Heath, and from thence to the said Palace of Westminster, to be preserved for his own disport, pleasure, and recreac'on," &c.

Queen Elizabeth hunted in this preserve, and took up her quarters in Canonbury Tower. The residence of Sir Walter Raleigh still remains as the "Pied Bull" public house, Islington, not far from this Tower. At the latter end of the reign of Elizabeth the population of England was only about 5,000,000, and of London about 140,000. The Queen was so afraid of its increase that she ordered no more houses to be built. The Stuarts did the same, but all to no purpose. In 1625 there were only twenty hackney coaches in London; but Charles I. disliked them "because they obstructed the streets, and rendered them dangerous to his Majesty, his beloved consort, and the nobility." Very soon we shall see London increasing at the rate of 500,000 every ten years, an amount of population which it did not reach from the Conquest till the end of the seventeenth century.

Highgate is situated on a hill 400 ft. above the level of the sea, and for a long time was a mere hamlet of houses scattered here and there amid the forests. It was not till the fourteenth century that the Bishop of London allowed a highway to be cut through his park and woods of Harringhay (the hare-inge-hayh, or meadow and wood of hares). A gate was erected and toll taken, and the place is said to have been called Highgate from this gate; but what was the name of the place before that time is not known. The bishopric of London had extensive woods and demesnes beyond this gate reaching to the gate of Hampstead Heath, now the Spaniards Tavern, to Finchley, where the bishop had a palace.

The chapel of Highgate which occupied the site of a hermit's cell, was granted by Bishop Grindal, afterwards Archbishop of Canterbury, in 1565, to a new grammar-school, erected and endowed the year before by Sir Roger Cholmeley, late lord chief justice. This was pulled down many years ago, and the church built in another part of the village. Among the tombs, however, was that of Coleridge, the poet and philosopher. The church was built in 1832, at a cost of 10,000*l.*, in the parish of St. Pancras; but Highgate was soon afterwards made a district of itself.

The unfortunate Richard II. was conveyed through Highgate, in 1398, on his way from the North, by his haughty rival, Bolingbroke, hooted by the rabble. In 1461, Thomas Scrope, baron of the Exchequer, was beheaded by the insurgents in Highgate. In 1745 the London train-bands marched through Highgate to encamp on Finchley Common, to defend the metropolis against Prince Charles and the Scots. Mr. Howitt remarks that he has seen a man, then 112 years old, who, as a boy, witnessed the battles of Preston Pans and Culloden. On West Hill is the Fox and Crown Tavern. Sixteen days after our Queen came to the throne, she was descending the hill with her mother, the Duchess of Kent, when the horses took fright, and dashed down the hill. The landlord, Mr. Turner, succeeded in stopping them; and if he had not done so, there would probably have been a change in the succession to the throne. Turner was allowed to place the royal arms over his door, and received a handsome present.

Coleridge settled at Highgate, in the house of Mr. James Gillman, surgeon, about 1800. At an early period he had used opium, and could not shake off that unhappy bondage. His physical strength gave way, and his mind was unstrung. "Here," as Carlyle says, "he sate looking down on London and its smoke-tumult, like a sage escaped from the inanity of life's battle, attracting towards him the thoughts of innumerable brave souls still engaged there,—heavy-laden, high aspiring, and surely much-suffering man." During this time he continued his literary work, and was visited by many of the chief literary men of the day. He died July 25, 1834, aged 61.

Mr. Mac Dowell, the sculptor of the "Reading Girl," resides at Highgate. His sculptures of "Love Triumphant," and "Death of Virginia," executed for Mr. Wentworth Beaumont, place him in a high rank in the artistic world. His son is a young sculptor of promise. In the old coaching days, travellers for the north stopped at Highgate, and at whichever of the nineteen public-houses it might be, "out came the horns, fixed on a pole, and the passengers were sworn to eat no brown bread when they could get white, unless they liked it better, and not to kiss the maid when they could kiss the mistress, unless they liked her better;" and a lot of other nonsense. This probably relates to the old passage-toll levied on horned cattle, and gathered by some park-keeper, who carried a staff with horns to show his authority.

At Fitzroy Park, an outskirt of Highgate, Dr. Southwood Smith lived, a very modest and clever man of science. He was physician to the London Fever Hospital, and wrote a valuable "Treatise on Fever," and "Animal Physiology," for the Society for the Diffusion of Useful Knowledge. In 1837, he was appointed by Government to inquire into the state of the poor, and many sanitary reforms resulted from his investigations. Dr. Smith died at Florence in 1861, and was buried in the Protestant cemetery there.

Highgate has retained more of its rural character than any other village in the suburbs of London. It has its old buildings, elm and lime tree avenue, and around stretch fields and hills. The house and estate of Caen Wood are the finest feature of the immediate vicinity of the village. The house is large and massive, of yellow stone, and was erected in the style of the reign of George III.; Robert Adam was the architect, and he also built Luton House and Gosford House. The rooms in Caen Wood House are lofty and convenient. The park and grounds are so arranged, that one has all the sylvan exclusion of a remote country mansion. Walks, two miles in extent, conduct you round the park, which contains fine beeches and cedars of Lebanon. Mr. Howitt says a custom is kept up here which smacks of the old feudal times. Every morning, when the night watchman goes off duty, at six o'clock, he fires a gun, and immediately three long winds are given on a horn to call the servants, gardeners, and labourers to their employment. The horn is blown again at breakfast and dinner hours, and at six in the evening for their dimissal.

The confederates of Guy Fawkes fled into Caen Wood, on the failure of the Gunpowder Plot. The hill at some distance from it is still called Traitors'-hill, and here it is supposed they stood waiting for the explosion, to assure them that the plot was successful. William Paterson, the founder of the Bank of England, lived near here: he was a Scotchman, and very clever. He collected the springs of Caen Wood into reservoirs, and supplied Hampstead and Kentish Town, till the New River Company was established.

Caen Wood House (or Kenwood House, as it is now generally called), in 1661, was the property of a Mr. John Bill, who married a Lady Pelham, supposed to be the widow of Sir Thomas Pelham, and a daughter of Sir Henry Vane. It afterwards became the property of the Earl of Bute, who married the only daughter of the celebrated Lady Mary Wortley Montagu. The earl sold the estate in 1755 to Lord Mansfield, who, on his death, devised it to go with the title to his nephew, Lord Stormont, whose descendants now possess it. Mr. Howitt gives a capital sketch of the life of William Murray, fourth son of Viscount Stormont, afterwards Lord Mansfield. His father had fourteen children, and was very poor, so that they lived chiefly on oatmeal, porridge, and salmon. Willie was sent to the grammar-school of Perth. He rode on his pony from Scone to London, being then fourteen years of age, with a bag of oatmeal hung from its neck. He entered Westminster school, and gained a good deal of learning. He pleaded at the bar, and a silvery-toned voice won him many admirers. In 1742 he became Solicitor-general, and eventually Lord Chief Justice of the King's Bench, and Chancellor of the Exchequer, with the title of Earl of Mansfield. He first decided that no slave can remain a slave in England. He was, however, against the liberty of the press, and supported the practice of pressing seamen. Lord Campbell tells us he had no *heart*; all he did might have been done from a refined calculating selfishness, with a view to his own credit. He had no warmth of affection; he formed no friendships; and he neither made exertions nor submitted to sacrifices purely for the good of others. ("Lives of the Chief Justices," ii., 576).

Oliver Cromwell built Cromwell House, a solid red-brick mansion, about the year 1630; but he is thought never to have made more than an occasional visit to it. Prickett, in his "History of Highgate," says, "Cromwell's House was evidently built and internally ornamented in accordance with the taste of its military occupant. The staircase, which is of handsome proportions, is richly decorated with oaken carved figures, supposed to be of persons in the general's army, in their costume; and the balustrade filled in with devices emblematical of warfare. On the ceiling of the drawing-room are the arms of General Ireton: this and the other ceilings of

* "The Northern Heights of London; or, Historical Associations of Hampstead, Highgate, &c." By William Howitt. London: Longmans. 1869.

the principal apartments are enriched in conformity with the fashion of those days. The proportions of the noble rooms, as well as the brickwork in front, well deserve the notice and study of the antiquary and the architect." The figures here mentioned stand on the posts of the staircase.

Andrew Marvell, the patriot, had a house at Highgate. He was the son of a clergyman at Hull. He became secretary of Earl Carlisle and assistant Latin secretary, with Milton, to Cromwell; and in 1658 became Member of Parliament for Hull. He mercilessly exposed kings and bishops. Charles II. issued a proclamation offering a high reward for his apprehension; and he retired to Hull, where he died soon afterwards, in his fifty-eighth year. Marvell was the first to discern and proclaim the magnificent genius of "Paradise Lost."

Not far from Cromwell House once stood Arundel House, the suburban residence of the Earls of Arundel. Norden mentions it in his "Survey of Middlesex," in 1596. The King slept here in 1624. Two interesting historical events took place here,—the flight from it of Arabella Stuart, in the reign of James I., and the death of the Chancellor Bacon, about fifteen years afterwards. Arabella Stuart was descended from Henry VII. Had James I. had no children, she would have been the next heir to the English throne. Elizabeth put her in prison to prevent her marrying; and, of course, James was not more favourably disposed towards her. William Seymour, second son of Lord Beauchamp, eldest son of the Earl of Hertford, fell in love with Arabella, and they were secretly married. James was furious when he heard of it, and sent the husband to the Tower and the wife to Lambeth. He then ordered her to be sent to the Bishop of Durham, and was only prevented by a fever coming on during the journey, and was brought back to Highgate, to Arundel House. Here she planned an escape for herself and husband, who was in the Tower, and she succeeded in getting away disguised in men's clothes, and got on board a French boat, which was waiting for her. Seymour escaped from the Tower disguised as a physician, but the boat containing his wife had put to sea, and he engaged with a captain of a collier to carry him to Flanders. His escape was soon discovered, and Arabella was taken, but Seymour escaped. She was taken to the Tower, and soon went out of her mind, and died about four years afterwards. Her husband was permitted to return after his wife's death, became Marquis of Hertford, and fought for the Crown in the civil war, though he had married the sister of the Earl of Essex, the Parliamentary general, and Charles II. restored to him the title of the Duke of Somerset, which had been forfeited by his great-grandfather, the Protector.

In 1626 the man who revolutionised philosophy and laid the foundation of all our modern progress in science, died here. For five years he had been a fallen and disgraced man, banished from court, and living in retirement. We owe him our gratitude for his "Novum Organum," but he certainly took bribes as a judge, which does not give us a very high idea of his morality. He kept great state, and his ostentation of liberality was somewhat pitiful. On his trial he delivered in a list of bribes taken by him on twenty-eight cases, and these amounted to 10,660*l.*, equal to 60,000*l.* of our money. He got chilled when trying an experiment respecting preserving bodies in snow, and then slept in a damp bed, and died at Arundel House, in the sixty-sixth year of his age.

On descending the hill not far from the Archway Tavern, is a massive stone, bearing this inscription:—

"WHITTINGTON STONE.

SIR RICHARD WHITTINGTON, LORD MAYOR OF LONDON.

1397 ..... Richard II.
1409 ..... Henry IV.
1419 ..... Henry V."

This stone takes the place of one at which Sir Richard, when riding here, having dismounted and walked up the hill, mounted again. It is not our intention to venture to disprove the cat story, but, at any rate, Whittington was a great man in his day. In the reign of Edward III. he made the king a present of 10,000*l.*—a vast sum in those days—towards the expenses of the war with France. Stowe says that he dealt in wool, leather, and pearls. He entertained Henry V. and his queen at Guildhall; and the king having praised the fire made of choice woods and spices, said he would make it still more agreeable to his Majesty. He then threw into it the king's bonds for 10,000 marks due to the Mercers' Company, 12,500 to the Chamber of London, 12,000 to the Grocers; to the Staplers, Goldsmiths, Haberdashers, Vintners, Brewers, and Bakers, 3,000 marks each,—of course an immense sum. Whittington built a church in Vintry Ward, almshouses, and a college; rebuilt Newgate, repaired Guildhall, and did many other useful works.

Mr. David Williams, founder of the Literary Fund, and minister of the Presbyterian Chapel, lived at Highgate. He was born near Cardigan in 1738, and was educated at a college of Dissenters at Carmarthen. He became minister of a small congregation at Frome, in Somersetshire, but soon removed to a more important charge at Exeter. The elder members of his congregation objected to his entering into social pleasures, but, as he happened to know something of their own private character, they agreed that if he left Exeter he should take the office of pastor at Highgate. In 1770 he appeared as the defender of Mossop against Garrick, and wrote the actor a letter, which resulted in Mossop being liberated. Williams detested anything like intolerance or bigotry. He retired to Chelsea after a time, and during his residence there he gave an asylum to Dr. Franklin at a period when there was great excitement against him. Mr. Williams proposed a scheme for universal uniformity of worship, and delivered a set of lectures illustrating this principle in the chapel in Margaret-street, Cavendish-square. In 1782 he published a work called "Letters on Political Liberty," which was translated into French, and procured him an invitation to Paris to assist in drawing up a constitution for France, but his advice was not taken, and the Revolution followed.

J. P., Jun.

GREAT PRIZES FOR ART WORKMANSHIP.

THE Council of the Society of Arts having in view the International Exhibitions about to take place under the management of the Royal Commissioners for the Exhibition of 1851, think it well to suspend for a time the form hitherto adopted in offering prizes for art-workmanship, believing that the change is likely to be beneficial to the object the council have at heart, viz., to see the art-workmen of the United Kingdom occupying a good position in the coming International Exhibition in comparison with those of other countries.

With this view, the council have decided upon offering a series of rewards for special excellence on the part of all concurring in the satisfactory production of works of industry of the highest character. They consider that they can most effectually ensure their object by offering to manufacturers the highest distinctions they have it in their power to confer, and to workmen liberal money premiums. They desire to obtain, from those who may be willing to compete for the prizes they offer, specimens of art-manufacture, which will have to be sent to the Society's rooms by the 14th of January, 1871.

These will be immediately judged upon their merits, and the premiums enumerated below will be awarded. An endeavour will be made to effect arrangements by means of which every object receiving a premium, or selected for the distinction of being exhibited, will be placed in the coming International Exhibition as a contribution on the part of the Society of Arts, showing the results of recent efforts made to improve art-workmanship in this country.

The specimens of manufacture sent in, in competition for the above rewards and premiums, will have affixed to them the name of the designer and of the workmen, in each special branch of industry involved in the execution of the work. Every workman will be eligible to receive money premiums proportionate to his merits, and to the degree in which he may have contributed to the successful results of the whole; while the manufacturer may receive the gold or silver medals of the Society.

The Society hope that they may receive objects enabling the judges to award the Society's gold medal to manufacturers; and the Society's silver medal to manufacturers or designers—accompanied in the latter case, if the circumstances appear to call for it, with money premiums; and to the art-workmen, money premiums from 3*l.* to 20*l.*, and to the extent in the whole of 500*l.*

These works may obviously include specimens not only of the taste of the designer, but of the skill of the carver, inlayer, metal-worker, chaser, bronzist, engraver, china-painter, die-sinker, cameo-cutter, glass-worker, enameller, mosaicist, and other art-workmen, either separately or in any arranged combination.

It is thought better not to define too closely the objects of manufacture likely to result from any such combination; but, by way of illustration of what the Society hopes to receive, may be mentioned the following:—

A cabinet with glazed doors, for the exhibition of articles of *vertu* of the highest character.
A toilet-glass suited for the boudoir of a lady of rank.
Any combination of goldsmiths' and silversmiths' work, with elaborate glass fittings, for the centre of a dining-table.
A chamber-organ, piano, or other musical instrument, combining enamels, inlays, marquetrie, and metal work.
A circlet or other personal jewel, executed with enamels, chasing, &c.
A case for a Bible, presentation volume, or any rare book, involving carving, inlaying, marquetrie, and precious metal work.

No object involving combined labour for its production will be eligible for reward, unless accompanied with the names of all those engaged in its production, to the most meritorious of whom—whether their works may be exhibited in the rooms of the Society, or in the International Exhibition—every effort will be made by the Council to give publicity, and attract attention.

Such combinations between the manufacturer, designer, and various workmen, will not preclude the award of premiums to individual workmen producing any object single-handed.

By way of illustration of the class of objects likely to be so produced, and to be highly regarded by the Society, the following may be mentioned:—

A drinking-cup.
A centre-piece for flowers in blown or twisted glass, decorated with filigrani, or enamel colours, or by combination with metal-work.
A candelabrum in wrought iron, brass, bronze, or other metal, with inlays, enamelling, damascening, &c.
A flower-box in modelled and painted china or earthenware.
A carved or modelled clock-case.
A carved or modelled chimney-piece.

The Council will far more highly esteem grandeur and beauty of style, invention, or elegant simplicity, than they will richness or minute elaboration.

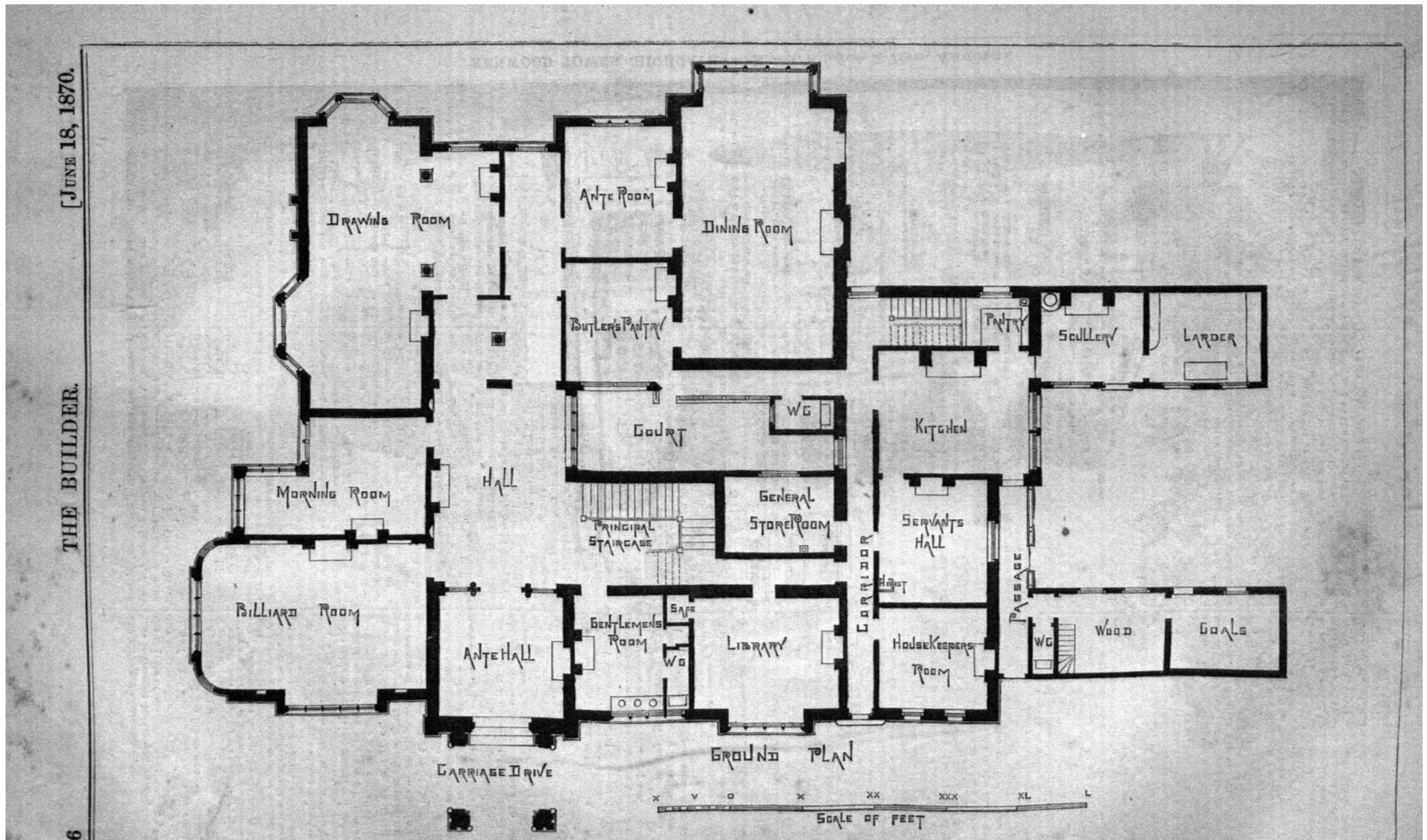
We earnestly commend these proposals alike to manufacturers, designers, and workmen.

KENWOOD TOWER, HIGHGATE.

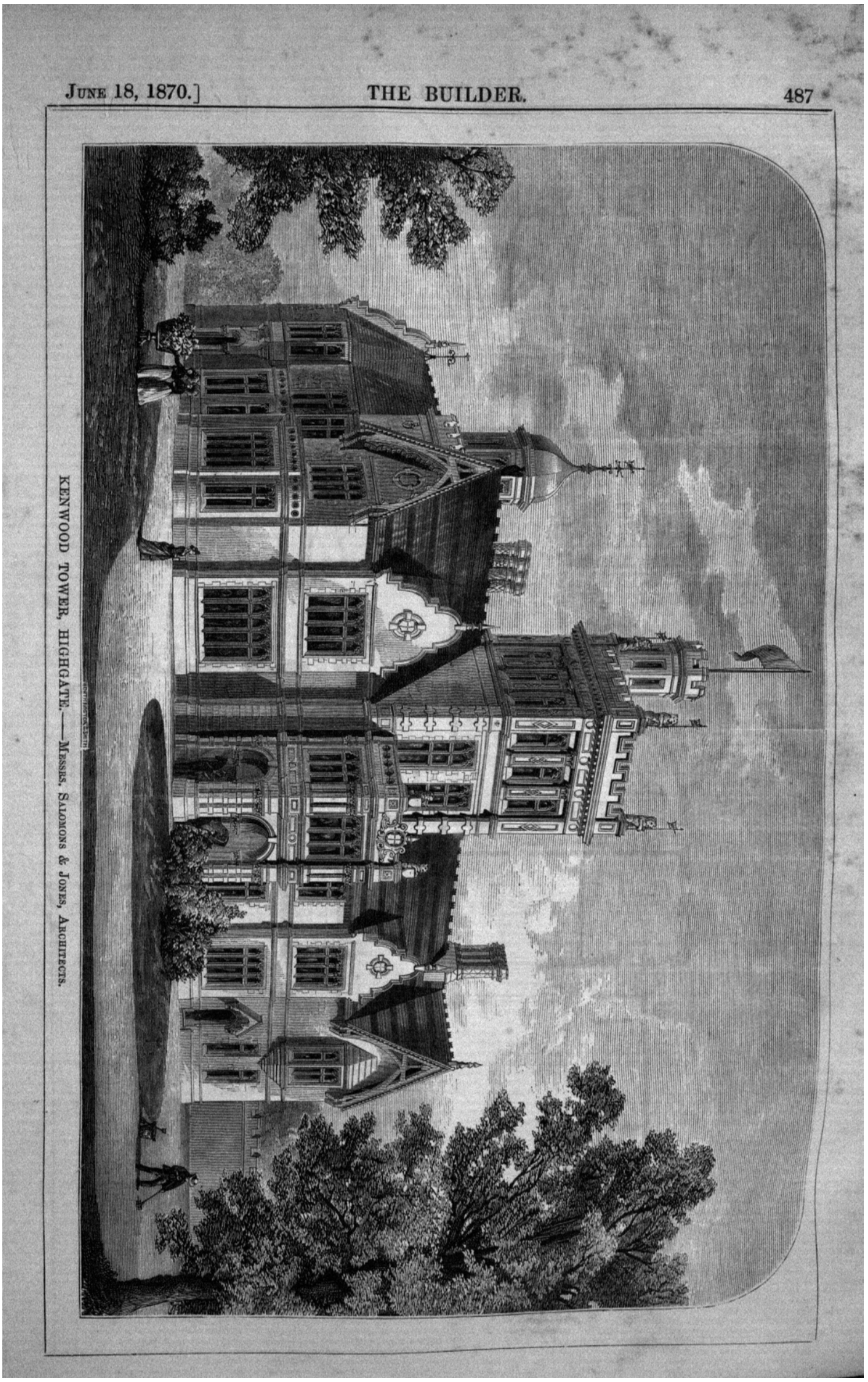
KENWOOD TOWER, now being erected for Mr. Edward Brooke, will have the external walls faced with Loughborough red bricks and rubbed Reading red brick quoins, all the dressings of the windows and other stonework being of Doulton freestone. The chimney-shafts will be of various patterns, and built up in small moulded bricks, supplied by Gumlin, of Cassy. The roofs are to be covered with ornamental red and dark grey tiles. The dining-room will have a moulded and carved ceiling in wainscot; also dado doors and window jambs, all of wainscot framing, moulded on the solid. The floor parquetry; the chimneypiece will be modelled and carved, with various woods and marbles: it will be the whole height of the room, and worked into the cove of the ceiling. The principal staircase is to be of wainscot, carved, of Elizabethan design, with an open-timbered ornamental roof, coloured. The billiard-room, ante-hall, and principal hall will be fitted up with pitch pine, of similar design to the dining-room. The upper portion of the windows in the ground-floor rooms is to be filled with stained glass, supplied by Heaton, Butler, & Bayne, the subjects to be suitable to each room. There will be a stained-glass window, too, on the principal staircase, filled in with the armorial bearings of the Brooke family; in the hall, large stained windows, with subjects from well-known fables. Polished marble columns and carved capitals are used inside, both in staircase, hall, and drawing-room. The conservatory and vineries will have an entrance from the dining-room.

Mr. E. M. Ward's picture, "Judge Jeffreys," and Mr. Frith's portrait of Mrs. Rousby, both in the present Royal Academy Exhibition, will hang in the dining-room here.

The contract is taken by Messrs. Jackson & Shaw for 10,126*l.*, exclusive of the conservatories, chimneypieces, and stones. The foundations have been put in by Messrs. Sharpington & Cole, who have also erected various decorative structures in various parts of the grounds. The clerk of works is Mr. G. Simonds. The whole of the works are being carried out from the designs and under the superintendence of Messrs. E. Salomons & J. P. Jones, architects.



KENWOOD TOWER, HIGHGATE.—PLAN OF GROUND FLOOR.



KENWOOD TOWER, HIGHGATE.—MESSRS. SALOMONS & JONES, ARCHITECTS.

RICHMOND, SURREY.

A COMMODIOUS chapel for the Baptist Congregation has just been completed and opened in Richmond. The building stands on a prominent freehold site near the railway station, and is constructed of corrugated iron, resting on a base of brickwork about 6 ft. above the ground level. It is approached in front by a flight of Portland steps, through an open deal porch, over which is a circular stained glass window. The pewing is also in deal. The pulpit and reading-desk are of oak, on a raised platform, at the rear of which is the open baptistery, with a vestry on each side. The size of the main building is about 80 ft. by 50 ft., and accommodates 700 persons. The height from level of floor or top of brickwork to the apex is 35 ft., with a bell-turret in the south-east corner 60 ft. high. The roof is boarded diagonally, and secured by perforated T-iron principals supported on iron columns, which divide the space into nave and aisles. It is lighted, artificially, by three crown pendants. The ironwork throughout has been painted with Calley's Torbary iron paint, which is said not to be liable to be affected by the action of the weather. The contract was taken by Mr. Giles Bennett. Total cost, 1,700*l*. The work has been carried out under the personal superintendence of Mr. Albert Bridgman, architect. Sufficient space has also been secured for Sunday and day schools, which will shortly be erected.

AN ARCHITECT'S ACCOUNT OF THE GIANT'S CAUSEWAY.

THE curious and wonderful assemblage of basaltic pillars on the coast of the county of Antrim, Ireland, known as the "Giant's Causeway," has been a thousand times described by artist, essayist, journalist, traveller, and poet. It has been a meet subject for the whole artistic and literary phalanx of Europe and America. Topographers have rounded it, geologists hammered it, painters limned it, poets apostrophised it, and Vandal excursionists bid fair, if not stopped for the next generation, to trample it down to the sea level, or pick it to pieces, to satisfy an uncontrollable and unwholesome passion of carrying home "a bit of the Giant's Causeway" to ornament their chimney-boards. Amongst all the sightseers who visited the Causeway, we have never known but one architect who visited it that described it. As this architect's account has not met the eyes of many, and as it is to our thinking one of the most interesting descriptions that have been given, we will present it to the readers of the *Builder*. Though written many years ago, it has lost nothing of its interest. The writer was an architect of eminence in the sister kingdom, who held during his lifetime a conspicuous place in his profession, and lived to find a successful rival in the person of his own son. R. Morrison, architect, for he was the writer, enjoyed good practice in Ireland. One of the name in the sister island has impressed his character, as our readers know, upon his works.

Our architect thus describes the Giant's Causeway:—"The sea cliffs contiguous to the Causeway are particularly high. You approach it by a narrow path, or a long dreary precipice almost impassable. Every image which presents itself has something uncommonly grand and magnificent. Above you, the impending rocks to a timorous fancy threaten instant ruin; around you the sea presents immensity, unless where the shore of Scotland gives the idea of a world set at a proper distance for contemplation; and below you, the dreadful precipice produces an effect of inexpressible solemnity.

The Causeway is a low head, extending from the head of the cliffs into the sea like a mole, consisting of a great number of polygonal cylinders or pillars, so closely united that the edge of a knife cannot be inserted between their adjacent side. At the first view this head did not appear to me so grand as I expected from the drawings I had seen of it; but when I came to walk on it, and to consider its plan and situation more attentively, it appeared a stupendous production of nature, extending from the bottom of the cliffs into the sea, but to what distance has never been ascertained. At low water the length of it appears to be 600 ft.; its breadth, in one place, 240 ft., in the narrowest, 120 ft.; it is very unequal likewise in its height. In some places it is 36 ft. high from the level of the strand, and only 15 ft. in other places. The pillars of which the causeway is formed stand most of them perpendicular to the plane of the horizon, yet the contexture of them is so adapted that there is no vacuity between them. I could not discern whether they run underground like a quarry or not. Some of them are very long, others short, and some for a large space are broken off an equal height, so that their tops make an even plane surface. Many of them are imperfect, crooked, and irregular; others entire, uniform, and handsome, and these of different shapes and sizes.

I found them almost pentagonal or hexagonal, a few excepted, of seven sides, and many more pentagons than hexagons, but they were all irregular, for none that I could observe had their sides of equal breadth. These pillars are some of them 15 in. and some 18 in., and some of them 2 ft. diameter. None of them are one entire stone, but every pillar consists of several joints or pieces, as I may call them, and the whole are jointed as close as it is possible for one stone to lie upon another, not jointing with plain flat surfaces. The upper ends of most of the pieces are concave, the lower ends convex, the prominences of which are nearly quarters of spheres, with rims round them. The length of each of these pieces which compose the pillars is 6 in., some 12 in., 18 in., and 2 ft., and easily separated, though so united in all appearance. When I parted them asunder, both the concave and convex superficies appeared very smooth, as are also the sides of the pillars which touch one another, being of a whitish freestone colour, but a much finer and closer grit. When I broke some pieces of them, the inside appeared like blackish iron grey, somewhat like the best limestone marble before it is polished, but of an extraordinary hard, close, and compact texture; their grit or grain so very even and fine that it hardly appears, but, where the stone is nearly broken, there it shows itself on its surface like a very minute, small glistening sand, thickly interspersed with the rest of the solid, and this (by reason of its parts being so closely combined together) has more specific gravity than most other kinds of stone. I must observe that, in my opinion, the curiosity of this place is much increased by the stones of which the pillars are composed being the irregular rather than the regular figures of geometry, as it is much more difficult to suit the sides of polygons together than squares and triangles, the latter being done easily by putting together two triangles equal to the square. I perceive in some of the stones the scheme of the 11th, 12th, 13th, 14th, and 15th propositions of the Fourth Book of Euclid, wherein an ordinate pentagon was inscribed; about it was circumscribed a circle: in another I observed a cylinder circumscribed about a cone. There is nothing more surprising than the piles of rocks here composed of a vast number of polygons; the external angles of each exactly suiting that made by the adjacent figures, and some rising like a flight of stairs to a considerable height.

At a small distance from the Causeway you discover in the impending cliff to the south-east, one large pile of those polygonal figures, so situated and united as to appear really to be what it is commonly called the Giant's Loome or Organ, as in perspective it resembles either. Another on the summit of the precipice has so much the resemblance of the chimneys of a house that the *Laia*, some ship of the Invincible Armada, mistaking it for a town, in the approach to it split on the rocks.

From observing at low water the rocks stretching a great length into the sea, and that there are similar ones on the opposite coast of Scotland, some have been led absurdly to imagine that there was formerly a design of uniting the kingdom by means of this Causeway!—a notion pregnant with folly. Others, from observing rocks in the precipice or cliff similar to those of the Causeway, have imagined that the sea, by undermining, has brought down these; but there is really no foundation for the remark, there not being any great similarity between the stone in the Causeway and precipice; and the pavement of the Causeway extends along the shore, where it could not have fallen from the precipice; nor can we, with any degree of reason, attribute to a chance fall a phenomenon so regular, so perfectly connected, and so extensive. Others, again, with a superior display of penetration, endeavour to account for the figures of the stone from the crystallisation of salts. This they found, I suppose, on the doctrine of l'Abbé Nollet, who, in his lectures on experimental philosophy, says that 'every salt when crystallised generally affects a figure which is proper to itself, and which probably depends on the figures belonging to its smallest part. Sea salt, for example, forms amber, saltpetre needles, sugar globules,' &c.

For my own part, I think it most reasonable to imagine that nature, which pursues infinite diversity of plans, forming some things for the use, others for the pleasure, of mankind, has left this and such like curiosities as perpetual subjects for our admiration, that, from observing the wonders of the visible creation, we might be led to sublime contemplation of the invisible Creator, and, as Democritus philosophised amongst the rocks of Abdera, were a man of reflection to confine his whole observation to this Causeway, and attentively to consider it, he would find himself surrounded by pregnant proofs of the divine wisdom and power. Indeed, all the works of human art must cease to attract if compared with this. Not the army of Xerxes, with an Archimedes to direct them, could form anything so wonderfully great, so uniformly various.

The usual attempts to explain this phenomenon appear to me very absurd. It had its name from the ignorant credulity of the unlettered, and superstitious vulgar causes, often of more absurd errors."

So ends the description given by an architect of a visit to the Giant's Causeway.

ON LIGHTNING RODS.

IN a lecture printed in the American *Gaslight Journal*, an attempt is made by Dr. Bushee, of Worcester, Mass., to show that lightning-rods constructed and erected according to the principles in vogue, tend at least as often as otherwise (the author says, oftener), to increase the danger.

The lecturer said, while observing effects of atmospheric electricity with reference to the construction of the lightning rod, my attention was called to the fact that a large majority of buildings struck by lightning had rods. Sometimes houses with rods were severely damaged, while others, in close proximity, without rods, escaped. In some instances buildings have stood half a century uninjured, but immediately after the application of rods, were struck by lightning. Such facts have done much to destroy confidence in rods, while on the other hand they call on us to answer to the question,—Are lightning-rods a total failure? If not, what are their defects, causing so many accidents? My decided convictions prompt the answer: they are not a failure in principle, but have become so to a great extent by defective application.

Passing over points of minor importance, the leading defects of rods in general, and the chief cause of disaster, appear to be due to imperfect connexion with the ground. The rod is usually run into the ground from 4 ft. to 6 ft., or until it is supposed to reach moist earth. This is a great mistake.

It is well known that clay, sand, and gravel are comparatively poor conductors, and the very limited surface which a common rod presents to them affords very inadequate means of relieving the rod.

In such cases the tip of the rod is often burned or fused, the glass insulators (if such are used), broken and thrown from their places, and frequently the ground where the rod enters more or less torn up.

When the rod is subjected to all the pressure it can bear, some slight causes often turn the balance of forces in favour of a lateral discharge; and this is often ascribed to the insufficient size of the rod, or to the form, or material, or mode of insulation, while the main cause of the failure of rods to perform their proper functions appears to be due, in nine cases out of ten, to an overcharge of the rod caused by the resistance of the earth.

In Worcester county over eighty cases have been reported in the use of a patent copper rod, in which evidence was left that the rod had been too severely charged. In a large majority the electricity leaves the rod at or very near the earth. Often the effect is shown merely in tearing up the ground. Moreover, in the most severe cases I have observed, the rod is invariably found imperfectly connected with the ground; usually much oxidated, and sometimes extending not more than 2 ft. or 3 ft. into the earth.

Dr. Bushee's recommendation (by no means a new one) is, that in all cases the rod should be connected with the water-pipes and gas-pipes with which our large towns and cities are furnished; which, being good conductors and pre-

senting large surface, promptly diffuse the heaviest charge to the earth. Such pipes have, nevertheless, been struck by lightning and the joints destroyed, and persons have been injured by electricity from gas-burners, but when a proper connexion is made with a good pointed rod, and hence the charge *gradually* received, no possible harm can occur.

He also recommends another mode which is not uncommon; that is, connexion with a well, spring, or permanent stream, this being in general a safe and reliable means. The rod should extend to some considerable depth into the water.

It is thought by some, he said, that metallic roofs possess some power of protecting buildings from lightning, but experience shows that buildings with such roofing are sometimes struck, and probably as often as other buildings under similar circumstances, and therefore require the same means of protection. Good points should be attached to the chimneys or highest part of the house, and connected with the metallic roofing. It is not necessary for the rods to be extended over the roof, and they may run simply from the eaves or lower edge of the roof to the earth.

HOW IS THE DEATH-RATE KEPT UP?

SIR,—The *Builder* is full of lamentations on the subject of defective sanitary arrangements, polluted rivers, and such-like sanitary abominations, and look at the result of this state of things. It appears the weekly returns of the Registrar-General for the future are to include several large towns not hitherto inserted in that official report, and on examining statistically the effect of past sanitary arrangements, I drew the following deductions therefrom. If we are to judge of the health of towns by the death-rate, it is clear very little progress, if any, has been made in effective sanitary improvements, and I think her Majesty will have to appoint another Commission to examine into the cause, as in 1844: although it is rather early for the moral effect of the last searching inquiry to be lost already, and for history to repeat itself so soon:—

	Estimated population. 1869.	For Ten years. 1851 to 1860.	Health of Towns Report. 1840, -41, and -42.
	Per 1,000.	Per 1,000.	Per 1,000.
Hull	25·37	24·1	30
Bradford	23·53	26·6	24
Liverpool	29·00	30·0	35
Sheffield	27·58	27·0	27
Birmingham	21·51	24·9	27
*Leeds	26·25	26·3	27
Newcastle-on-Tyne	26·10	27·4	27
Bristol	24·22	23·2	31
Manchester	28 97	29·4	32
*Salford	26·75	26·2	28

Thus it appears in the above list there is a slight increase in the death-rate of two towns (marked *) from 1840 to 1869, and in the other towns there is little, if any, change; so our labours for the lastthirty years have produced very little effect. The new year has opened more disastrously. It is very self-evident, and well understood, that sanitary works, if efficiently and properly carried out, do materially reduce the death-rate, as we have many towns that are cases in point; but it appears from some inexplicable causes our large towns do not profit by them to that extent that we ought to expect, and I think the excess of deaths should not be attributed to but should be quite irrespective of, the increase of population.

I am one of those sanguine enough to believe that it is possible, with proper sanitary works, and sanitary measures strictly enforced in towns, to reduce the death-rate to a minimum,—say not *exceeding 2 per cent. of* the population, and it is therefore perfectly clear that our provincial town authorities have now had more than a quarter of *a century's fair and indulgent trial*, and they have proved themselves wanting. The action of the Royal Commission now sitting might very well be directed to this important subject, so as to stimulate our slumbering town authorities as a temporary measure; and for a permanent improvement a Minister of Public Health should be at once appointed, with a skilful and energetic staff, who would frequently and periodically survey our dirty towns and the plague spots in them, and thus by these means remove the foul blot that now defaces our national escutcheon.

B. B.

St. Mary's, Exeter.—It is proposed to add a tower to St. Mary's Church, as a memorial of the late Bishop.

CHURCH-BUILDING NEWS.

Goudhurst.—The old church of this parish has, for some time past, been undergoing internal restoration, which will soon be finished. The proprietors of Bedgbury and Combwell, Mr. A. J. B. Beresford Hope and Mr. H. J. Campion, are restoring the south chantry, at an expense of some 400*l.*, and there only remain the south aisle, as wide as the nave, and the north chapel, to complete the internal restoration. The church was filled with the highest of pews, and had the usual western gallery with small organ. Nearly all these have been removed. All the windows except one had been despoiled of their mullions and tracery. Three of these have been restored at the expense of Mr. R. Oakden, and three others by Mrs. Cramer Roberts, Mrs. S. W. Newington, and Miss Miller. A new pulpit, of oak, on a stone base, carved by Forsyth, was the gift of the late Mrs. Henry Lake, of Highgate. The restoration of the north aisle has cost about 1,000*l.* The chancel has been restored by the Ecclesiastical Commissioners, two entirely new windows being inserted in the east and north walls. The east window is of coloured glass, executed by Messrs. Clayton & Bell. It consists of three lights and represents the subject of the "Crucifixion," treated triplet-wise. In the northern light are the "Three Marys standing by the Cross;" and in the southern light, "Joseph of Arimathea, Nicodemus, and the Centurion." The north window represents the "Supper at Bethany."

Loppington.—The re-opening of Loppington Church, near Wem, after its thorough restoration, has been celebrated. The greater portion of the edifice has been rebuilt, with the exception of the tower, the circular arches of which point to its Norman origin. It is a stone building, with freestone facings; and the high pews have been replaced by low-backed seats. It is also fitted up with a heating apparatus. The work has been carried out by Messrs. Bowdler & Darlington, Shrewsbury, from plans by Mr. E. Randall, of the same place. The work of restoration required the sum of 1,600*l.*, which has been raised, or nearly so, by public subscription. The restoration of the chancel has been done by Mr. Vaughan and Captain Dicken, at a cost of 300*l.*

Wombridge.—The parish church here has been re-opened for divine service, after rebuilding, except a portion of the tower, which has been refaced. The new church is built on the old foundations, with the exception of the chancel, which has been extended. The church is cruciform in plan, and provides sitting accommodation for 350 persons. The walls are faced with Cefn stone, and the dressings are of the same material. The cost has been 2,000*l.*, and the work has been carried out by Messrs. Millington & Son, of Oakengates, builders, from the design of Mr. George Bidlake, of Wolverhampton, architect. The whole of the windows, except one, are filled with rolled cathedral-leaded quarry-glass, of a light warm tint, with a margin of a greenish hue, by Messrs. Done & Davies, of Shrewsbury, who have also filled the other window with stained glass. The subjects in the last window were specially chosen by the vicar, on account of the late Mr. Oliver's kindness to children, it being to the memory of that gentleman that the window has been erected. The subjects which the memorial window contains are, "Christ with the Doctors in the Temple," and "Our Saviour blessing little Children," with a canopy over each. Underneath the subjects is a base, which also forms a small canopy for the lily which is introduced at the bottom of the window. The church will be warmed by an apparatus supplied by Mr. Dodwell, plumber, Shrewsbury. In excavating for a road around the church, the workmen met with some walling belonging to the original fabric. It was 2 yards thick, and appears to be of the date of 1216.

Wantage.—West Hanney Church, after restoration, has been formally re-opened by the Bishop of Oxford. Mr. Jas. Brooks, of London, provided the plans. The total estimate was 1,700*l.*, in which was included the porch over the principal entrance on the north side, where there is a Norman arch, and also the chancel. Sufficient funds not having been raised, the vicar was compelled to limit the work to about 1,100*l.* The church is fitted with stained deal seats, all unappropriated, and will seat 300 persons. Under the seats the floor is boarded, and the aisles are laid with Staffordshire tiles. An open-timbered roof, stained, covers the nave. The plans have been carried out by Messrs. Longmire & Burge, of London.

Radwinter.—The parish church of Radwinter has been re-consecrated, under its former dedication to St. Mary the Virgin, after having undergone a restoration in every part except the tower. The church has been enlarged by adding one bay to the nave, and therefore the chancel has been thrown forward. The architect was Mr. W. Nesfield. The old square pews are replaced by plain deal benches. The chancel is elevated three steps above the nave, and is paved with tiles. The chancel stalls are of carved oak.

Elmsted Market.—At a meeting of the building committee appointed to carry out the erection of a new church at Elmsted Market, the plans of Messrs. James Stannard & Co., of Leicester, were submitted for inspection, and accepted, the estimated cost of the church being something over 2,000*l.*

Barnsley.—The restoration of St. Mary's Church has been commenced. The designs for the alterations are furnished by Mr. Bodley, of London, architect; and the work, which is of an extensive character, including the entire remodelling of the interior of the church, and the opening out of the west window, which is to be filled with stained glass, in memory of the late Mr. J. S. Beckett, will occupy some time.

Kidderminster.—We hear that a new church is to be erected at Franche. Plans for a small structure have been prepared by Messrs. Martin & Chamberlain, of Birmingham, and the contract for the building has been taken by Mr. Thompson, of Park-lane.

Nether Denton.—The new church at Nether Denton has been consecrated by the Bishop of Carlisle. This church has been erected to supply the place of an old structure dedicated to St. Cuthbert. The new building is in the Early English style of the thirteenth century, and is calculated to accommodate 140 persons. It consists of a nave 45 ft. 6 in. in length, and 21 ft. broad; and a chancel, 26 ft. 3 in. by 17 ft. 6 in., on the north side of which is an arch containing a harmonium, separated from the vestry by an oak traceried screen supporting a grille of ironwork glazed. The entrance is by a covered porch on the south side. The chancel is lighted by a triple lancet window, filled with stained glass, by Messrs. Gibbs, of London, representing the Crucifixion and other Scriptural incidents. The tracery is plain and undecorated. The south and north sides are perforated with a continuous arcade of single lancet windows, one or two of which are filled with stained glass. The west end is lighted by two large lancet windows. The walls are double, with a space between them, the inner part being of chiselled and square stonework, without plaster, by which means the church will always be dry; and the exterior of the church being of white stone, of a description which abounds in the neighbourhood, and contrasting with the red sandstone from Wetheral, of which, in lieu of slates, the roof is composed. There is a double bell column at the west end of the edifice. Messrs. Cory & Ferguson were the architects, and under their superintendence the building was erected. Mr. W. Armstrong, of Gilsland, contracted for the masonry; Mr. Court, of Carlisle, supplied the woodwork; Mr. Norman, of Carlisle, contracted for the roofing; Mr. Thompson, of Carlisle, for the plumbing; and Mr. Bell, of Wigton, for the painting and glazing. The cost of the church was about 1,000*l.*, part of which is not yet subscribed.

Bestwood Park.—A new church has been erected here, and opened for divine service, according to the *Notts Guardian*. The church is built of stone. It will afford accommodation for nearly 200. The edifice is without aisles, and consists simply of an entrance up the centre, with seats on each side. The chancel is an apsidal one, and on the north side this part of the building opens, by means of a couple of small arches, into a vestry and organ (or rather harmonium) aisle. The windows are small, but numerous and deeply recessed. The porch is a feature in the building. The west end of the church is surmounted by a bell, hung in an open turret. There is a coloured window over the communion altar, and in the arrangements for this part of the church, the Duchess of St. Alban's worked the communion cloth. The seats consist of low chairs. The Duke of St. Alban's has aided in the cost of the edifice, and at the opening. The Duchess played the harmonium and started the singing.

Kettering.—The new church of St. Andrew the Apostle, at Kettering, has been consecrated by the bishop of the diocese The church, which is

built at the north end of the town, is of the Early English character, and is capable of accommodating 550 persons. It consists of a nave, south aisle, vestry, and chancel, and has been built at a cost of about 5,000*l.*, by Messrs. Barlow & Butlin, of Rothwell, from the designs and under the superintendence of Mr. Street, of London, architect. Mr. Godfrey was clerk of the works. The roofs, both of the chancel and of the nave, are high-pitched, and the pavement is of encaustic tiles. There is a small bell turret, with spire. Chairs are used in the church, to be replaced as soon as means are obtained by open seats. The lectern is of brass, and the altar cloth is of maroon-coloured velvet. The frontal was worked by Mrs. W. Lindsay, sister-in-law of the rector, and the super-frontal by other ladies. Previous to the service, a crozier was presented to the Bishop. The crozier was designed by the Rev. F. H. Sutton, vicar of Theddingworth, and executed by Messrs. Skidmore & Co, of Coventry. It is in the style of the middle of the fourteenth century; the staff is of ebony, with ivory bosses, and the head is ivory and silver-gilt, jewelled with carbuncles, topaz, and lapis-lazuli. It is the gift of certain laymen in the Archdeaconries of Northampton and Leicester.

Walworth Common.—The foundation-stone of a church, to be called St. Stephen's, Walworth-common, has been laid. The temporary iron structure at present in use is too small. The site of the church is in Villa-street, between Albany-road and Westmoreland-road. The architects are Messrs. Jarvis & Son.

Middle Claydon.—The church here, having been restored, has been re-opened by the Bishop of Oxford. Care has been taken, where practicable, to maintain the original fabric intact. The exterior has been restored, Dalton stone being used in the repairs. The tower and the chancel are of the perpendicular style of architecture, the latter having been built in 1519, by the Giffard family. The tower has three bells, which have been rearranged, new-framed, and re-hung. In restoring the porch, the old oak front has been stained and made the main feature, the new parts being in keeping. A new vestry and lobby have been built on the south side of the chancel, like the tower and chancel, in the Perpendicular style. In the interior, the old gallery has been taken down, and also the ringing-floor, a new one having been put up over the western arch. The old roof of the nave has been taken down, and a new oak panel one has taken its place, one beam being left to show the reproduction of the ancient work. The seats, the lectern, and the prayer-desk are all new, and are of oak. The old pulpit (also of oak), having been re-adapted, and fitted with new base, stairs, &c., has been retained. In the sill of a window in the nave a piscina was found, and has been repaired. The carved oak screen has been restored. In the chancel, the wagon-headed oak roof is embellished with red and gold devices, and the bosses are gilt; Messrs. Clayton & Bell, London, being the decorators. The communion-steps are of superior Devonshire marble, and the remainder of the church is paved with encaustic tiles, by Mr. Godwin, of Hereford. The alabaster monument of the Giffard family has been taken from the mural position it formerly occupied, and placed in the chancel. The monument by Chantrey of the late Sir Harry Calvert, Adjutant-General of the Forces, has been restored and decorated, as have also all the other monuments. The reredos, occupying the whole of the stand of the chancel, is of alabaster, executed by Messrs. Farmer & Brindley, of London. The centre portion is divided into three subjects—the middle one being the Ascension, that on the left the Resurrection, and that on the right the Day of Pentecost, carved in alabaster, and surrounded by carved canopies. The total cost of the restoration will be very nearly 3,000*l.*, the chief portion of which will be borne by Mr. Frederick Calvert and Lady Lucy Calvert. A short time since the inhabitants of Steeple Claydon were indebted to this same source for the spire of their church. The work has been superintended by Mr. G. Hannaford, under the directions and from the designs of Mr. George Gilbert Scott. The builders were Messrs. Franklin, of Deddington.

Fryerning.—St. Mary's Church, Fryerning, has been re-opened, after having been closed about twelve months for restoration and repairs. The works have been carried out by Messrs. Brown & Son, under the direction of Mr. Chancellor, of Chelmsford, architect. Judging from the extreme plainness of the stonework of the north and south doorways of the nave, and of the nave windows, the walls of the nave and chancel of this church are believed to be Norman work, probably of a very early date. The walls are constructed principally of the conglomerate, commonly known as "plum pudding stone," mixed with the thin Roman bricks, septaria, and large pebbles. Very little (if any) alteration appears to have been made in the walls, which are very substantial, beyond the insertion in both nave and chancel of windows of a later period. The wall at the west end of the nave appears to have been cut away, and a brick archway formed, opening into a fine specimen of a brick tower, erected very late in the fifteenth century. Previous to the present restorations the roofs of both nave and chancel were comparatively of a modern date, with the exception of two massively-constructed principals at the west end of the nave, which were, no doubt, the remains of an original roof, and which evidently supported one of the ordinary wooden steeples of the county, thus proving that the present brick tower, when erected, was altogether an addition to the church, and not built upon the site of a more ancient tower. The restorations that have been carried out include the stripping off the plastering from the outside walls all round (thus exposing again to view the old conglomerate walls of the Norman period), the restoration of the stonework of the Norman and other windows and doors, and the construction of entirely new open roofs of oak timber, tiled. Internally the chancel arch has been rebuilt in stone, the west gallery removed, and the brick archway of the tower opened up, the whole of the old pews and sittings taken out and replaced with oak benches of simple design, with oak pulpit, reading desk, and lectern, in character with the benches, the gangways being paved with tiles. In order to preserve the church from damp the surface all round has been sunk below the level of the floor and paved, and the church itself is heated by hot water. The organ has been rebuilt, and removed from the west gallery to the north side of the nave, at the west end, by Mr. Rust, of Chelmsford. The total cost of these restorations amounts to about 1,400*l.*

WEEKS'S DUPLEX BOILER.

THE upright tubular boiler which has been patented by Messrs. Weeks & Co. appears to possess considerable merit. It is so arranged that it is impossible for the whole boiler to fail, as, being made in two halves, the contraction and expansion are entirely neutralised; and should any unforeseen accident occur to one half, that portion can be detached and removed without in any way interfering with the working of the other half. The shutting off of either half of the boiler is accomplished by means of gun-metal valves and chambers. The arrangements for removal of sediment seem so simple that any ordinary labourer may clean out the boiler at any time without withdrawing the water from the apparatus or removing a single brick in the furnace. The patentees claim that the boilers being made of cast iron, their durability is far greater than those made of wrought iron, and they show their own confidence in their durability by insuring them for fifteen years.

SEWAGE IRRIGATION AT ABERDEEN.

AN experiment in sewage irrigation, the first, probably, so far north, is being made on land belonging to Lieut.-Col. Henry Knight Erskine, of Pittodrie, on his Spittal lands, a little to the north of the city of Aberdeen, between King-street-road and the sea. An agreement was entered into between the Commissioners and Colonel Erskine on the footing of the sewage being sold to him at the rate of 5*l.* per acre to the extent of the land cultivated, he being restricted to a maximum of 5,000 tons per acre per annum. The price of the sewage is thus about a farthing per ton. The whole extent of the land intended to be irrigated ultimately is from fifty to sixty acres, and the sewage is leased for nineteen years. The land lies immediately inland from the Old Town Links, is of fair quality, and has been under ordinary cultivation. The ground in great part has a pretty uniform slope, the primary requirement for sewage irrigation. The whole supply is diverted, when not required, down the main sewers to the ordinary outlet at the harbour. The catch-water drains run off the water to the main spill-water channel, which takes the exhausted sewage away into a burn in the neighbourhood of the Links, and thence into the river Don. The cost of two sewers and tank was about 550*l.*, which will be defrayed partly by Colonel Erskine and partly by the Police Board. The land was prepared in February last. The system of supply and distribution has been found to work well, the sewage flowing easily and uniformly over the land. The exhausted sewage is remarkably clear, while there is no perceptible smell from the operations. These are carried on upon the same principle as at Edinburgh, Barking, Croydon, and other places. The engineering works have been planned and superintended by Mr. R. Anderson, C.E., the Police Board's surveyor. The Lord Provost of Aberdeen has lately visited Hastings, to examine the A B C process of utilising sewage; and the Police Commissioners have put into the hands of Professor Brazier the matter of an analysis of the liquid used in this process, with the view of testing it in connexion with Aberdeen sewage.

THE INSTITUTE OF ARCHITECTS AND THE 1871 EXHIBITION.

No disposition being shown, although certain fresh commissioners have been nominated, to place the president of this Institute, *ex officio*, in the same position as the presidents of other like scientific and artistic bodies, the Hon. Secretary states that the Institute, representing the profession of architecture, feel themselves precluded, on account of this marked omission, from taking part, as a body, in the International Exhibition of 1871.

IS DISTORTION IN ARCHITECTURE THE STYLE OF THE PERIOD?

MANY modern instances of wryness in design seem to show an effort to repudiate the adage of the days of Ben Jonson, which says "By line and rule lives many a fool." If there is any wisdom in adopting a tag-rag style by reproducing broken outline and unfinished or decayed design, we are wise in our generation. Is it the freedom of Freemasonry, or for moonshine effect, that would-be baronial villas, and even streets, have so many nondescript towers and turrets so helplessly copied in detail, and stuck to, with tumble-down effect, as if some after-thought or blunder, which puzzles us now to make out what the taste and style of the period is? So future antiquaries may well say (from Marmion):

> "The towers in different ages rose;
> Their various architecture shows
> The builders' various hands."

Since Scott built his "romance in stone and lime at Abbotsford, my conscience!" what a host there has been of retrogressive imitators of the romantic in building, often without much regard to present fitness; such as the reproduction in costly stone of the toppling lath and plaster features of old Edinburgh, now excluding dwellers there from plain substantial houses so much required by workmen, and also, by way of contrast, to the broken outline of the ridgy back, piled deep and high, of the old town.

The old times have left much that is good to imitate: why should the beauty and taste of Mediæval design be generally so poorly grasped at in modern church-building?

Although the vast proportions of the perfect cathedral church may not be required, perfect, true, and harmonious construction should adorn all churches and chapels dedicated to the worship of an all-perfect Creator. Ancient Pagan temples and idol shrines had true and beautiful proportions, as also had the finished Christian places of worship of the Dark Ages. Why, in these enlightened times, perpetrate such distortion in erecting so many lop-sided churches, with "the taper spire that points to heaven," put up as chance or whim may dictate? Many churches built to please the priest, remind one of the hunchback who, after hearing a friar preaching on God's works being all perfect, asked what could be said of him? "Why," said the friar, "you are a perfect hunchback."

Surely imperfect copies of the fervent art of the builders in past ages need not be set up all over the land in hotch-potch style, as without being able to read sermons in stone we but play the fool's part, in pursuit of mere empty shadow, following the Jack-o'-Lantern of an absurd taste for retrogressive imitations in detail, without the true spirit of the old builders, "whose works have not followed them."

J. K.

CEYLON.

THE foundation-stone of the new Public Markets and Municipal Offices, Colombo, was laid on the 22nd of April last by his Royal Highness the Duke of Edinburgh, in the presence of a large number of spectators, for whom temporary sitting accommodation was provided in an octagonal structure, 70 ft. in diameter. A guard of honour of the 73rd regiment presented arms as the ducal party drove up, the band playing the national anthem, and on alighting under the triumphal arch at the entrance, the Prince and the Governor were received by the chairman and members of the council. The Duke, on advancing to the centre of the octagon, was greeted with loud cheers, and took up a position to the left of the stone. A suitable address was then read by the chairman, and the Prince proceeded to lay the stone in the usual form, assisted by the architect, who had been previously presented to his Royal Highness. The trowel was of chased silver, bearing an appropriate inscription, and the arms of the Municipality, with a ducal coronet at the extremity of the ivory handle. The stone having been declared by the Prince "well and truly laid," the proceedings terminated.

The buildings will consist of two detached blocks, one 200 ft. by 60 ft., running parallel with the face of the site; and the other 170 ft. by 80 ft., at right angles to it in the rear. The central portion of the former will contain the offices of the municipality, with a double row of shops on each side, covered with iron roofs. The rear block, which is to be used as a public market, will be entirely of iron. The buildings generally will be of an ornamental character, and a lofty clock tower is to form a prominent feature. The buildings have been designed by Mr. James G. Smither, Government architect, under whose directions the work is to be carried out.

THE CONDITION OF LINCOLN.

OUR correspondent, "Gargoyle," has sent a reply to "A Lincoln Householder," in which he maintains the correctness of his former statements, and concludes with the observation,—"I still think that at Lincoln the arts are sacrificed at the shrine of Mammon, and that, in their efforts to avoid Scylla, the powers that be are falling fastly into Charybdis."

We do not think it necessary to print the whole. The correspondence will doubtless serve to lead enlightened inhabitants of Lincoln to look about them, and probably result in advantage to the city,—a place of unsurpassed natural beauty, with an unrivalled cathedral, and rich in associations.

SWANSEA WATERWORKS.

SIR,—On the 21st of May (p. 410), and the 4th of June (p. 453), there are some remarks relative to the Swansea Waterworks. Will you allow me briefly to say that Mr. Williams, the contractor, received 500*l.* as a bonus for completing the line of conduit before the time specified in his contract, as Swansea was suffering a water famine. The completion of this conduit enabled Swansea to receive, subsequently, in three years, not less than 3,000 million gallons of water, which, at 2d. per 1,000 gallons, would represent 25,000*l.* This, in my opinion, is a liberal return for the bonus of 500*l.*, and also warrants some expenditure in present repairs. Mr. Williams had, in his contract, a large work to execute, in and over a most difficult country: in my opinion, he did this work well and honestly, and earned all the money paid to him. Works of all kinds require supervision and repairs,—waterworks more, probably, than ordinary works, as water is unceasingly active; and, when confined by an embankment or in a conduit, active for mischief. The conduit at Swansea is some 7 miles 300 yards in length, laid, in part of its course, over a coalfield in work. There are also trees on part of the line, and rootlets have entered at joints not more than 1-16th of an inch wide, which have forced such joints, and caused leakage.

The conduit is, however, now in course of repair, and I hope the cost may not be very large. But, large or small, Mr. Williams, the contractor is not answerable for it. In my opinion, the editor of the *Cambrian* is wrong in stating the cost of the Swansea Waterworks at "160,500*l.*," and the income at "3,500*l.* a year." The cost, including town service-pipes to the extent of nearly 16,000*l.*, as given in my final report, is 70,355*l.* 13*s.* 8*d.* This report, with all its details, has been at the service of the editor of the *Cambrian*, but he does not appear to have used it. As to the income of the waterworks, if my recollection be correct, this, in 1868, amounted to upwards of 6,000*l.* per annum, and was increasing. As a rule, I do not notice these local statements, and I now only ask you, Mr. Editor, to give a place to these remarks and explanations to enable me to say that in my opinion the public of Swansea never expended 500*l.* to better purpose than in giving it as a bonus to Mr. Williams, the contractor, for the work done. I wish also to say that Mr. Cousins, the borough engineer, is only responsible for the due maintenance of the works as handed over to him. Personally, I feel under a deep obligation to Mr. Cousins for his untiring courtesy to me during my connexion with Swansea. He has carried out the sewerage and drainage within the town in the best manner, and with good sanitary results.

ROBERT RAWLINSON.

RAFFAELLE AND MICHELANGELO.

BURLINGTON FINE ARTS CLUB.

FEW persons ascending the narrow stairs of 177, Piccadilly, to rooms over a shop, would suppose they were entering the premises of a club that includes a considerable number of well-known lovers of the fine arts, and where, from time to time, very remarkable collections of works of art of past ages are exhibited. Such, however, is the case. A change in this respect, is looming in the distance. The number of members is to be increased from 250 to 500, when the committee will be in a position to recommend removal to a larger house, and to take such other measures as shall increase the advantages of the club. The honorary secretaries are Messrs. Ralph N. Wornum and J. Beavington Atkinson.

The exhibitions, to which we have alluded, have for their object the thorough elucidation of some school, master, or specific art. On the present occasion it consists of a collection of drawings and other illustrations of the works of Raffaelle and Michelangelo of rare merit and interest. Her Majesty the Queen lent for a few days, in aid of the collection, a number of original drawings from the Windsor Castle collection. These have been removed, but what remain will afford ample enjoyment to those who, through knowledge of a member of the club, obtain the privilege of examining them.

"NEW BRITISH INSTITUTION."

A COLLECTION of pictures by old masters and deceased British artists is now on view in the gallery, 39, Old Bond-street. We should belie our convictions if we said that we expect this Institution, as at present constituted, to supply the place of the defunct British Institution, *quoad* an exhibition of "Old Masters." Putting this idea quite on one side, we may fairly say that an interesting collection has been brought together on the present occasion, and will well justify the expenditure of a shilling. Some of the pictures are avowedly the property of dealers, and are for sale; the remainder are lent by owners. In the whole there are 140 pictures, many of them good.

A NOVEL COMPETITION.

THE French Society of Architects of the Department of the North have instituted a competition with the view of making known works of modest merit. They invite the transmission of two photographs of an entrance-door to a private residence, including the door-frame and surroundings, such as the balcony above, should such occur. The selection of the best will be made by the architectural societies with which this society is in connexion. The photographs must be sent by the 30th of September next, and must be from the executed work, not from drawings. Reputation is the chief prize offered, but medals will also be given, besides one complete set of the photographs to the competitor whose work is selected as the best.

As Mr. Vandenbergh, the secretary, who dates from Lille, requests us to make the competition widely known, we conclude it is international. The programme issued by the society may be seen at our Office.

DRAINAGE OF LIVERPOOL.

SIR,—Some two years ago I was permitted, by your favour, to make some observations on the then bad sanitary condition of Liverpool, with its resulting high death-rate, which stood at 36 per thousand. Since that time a vigorous policy of conversion has prevailed; that is, great numbers of privies have, on the certificate of the medical officer of health, been forcibly converted into water-closets, the effect of which, coupled with the late cold spring, has been to reduce the death-rate to 22 per thousand, a rate nearly rivalling the proverbially healthy towns of Salford and Bristol.

Lately, however, a feeling seems to have sprung up among some members of the health committee that their medical officer was doing too much; not exceeding his duty, but straining a point towards the pursuit of health greater than the pockets of the landlords or owners of house property were disposed to bear; and although they have spent already a million of money in sewering the town down to the tideway of the Mersey, yet they are lending a willing ear to each and every one of the systems lately proposed, from the dry-earth system to disinfection, &c., plainly intimating at the same time, though not in a direct manner, that they desire the medical officer to stay his hand; while he, being responsible to the public, is distracted, and does not know how to proceed.

One would think, in face of the facts, and remembering that Liverpool is mainly built on the slopes and top of a high hill forming a rocky bay, with the river at its base, that it would be better to wait a little and see the effects of the various trials now being made in several inland towns, where no such facilities as exist here for the disposal of the sewage are available;—let well alone, in fact, until it is shown that something better is applicable; but no: some evil influence is working, and this public body, the health committee, hold private meetings, from which the reporters are excluded, for the avowed purpose of changing, if possible, the disposal of the sewage of the town. Having in view the large amount of money already spent upon the sewers and the present depressed state of trade, the people look upon these private meetings with some alarm, because it is evident that the creation of a perfectly healthy town is not the primary object of the health committee, or they have only to pursue the policy of conversion to obtain it, and any other object we, the public, hold to be beside their duty. How is it, we ask, that the committee, instead of pursuing a wavering, peripatetic policy, do not order and compel, as they have the power, owners and others to alter and convert privies into water-closets by a given date? Each owner would then be treated like his neighbour, and no favour could be shown or dissatisfaction arise. Life and health are at any time and in any place of vastly greater value than any mere sewage, and the people of Liverpool would be glad of your help towards that object.

E. G.

CAMBERWELL CHARITY ESTATE COMPETITION.

SIR,—For the information of your subscribers who may have been misled by the letter of your correspondent, Mr. Gough, inserted in your issue of the 4th inst., I beg to state that the design sent in by the local surveyor to the charity has not been pronounced the best, &c., by the committee. That it has not been determined to refer the decision on the plans to the Vestry Surveyor. That the terms "surveyor" to the charity and "vestry surveyor" are not synonymous; therefore no competitor has to adjudicate upon the designs. That it has been proposed by the General Purposes Committee "that the vestry appoint some disinterested member of the profession to report upon the plans, and leave the award in his hands;" and that the matter only awaits such a recommendation to be ratified by the vestry.

GEO. W. MARSDEN, Vestry Clerk.

STAINED GLASS.

MESSRS. CLAYTON & BELL completed two important windows for Whit Sunday. One is in *Doncaster Parish Church*, the great window in its south transept, and has been raised in memory of the late Dr. Schofield. The subjects chosen for the work are Scriptural incidents recorded only in the Gospel of "the beloved physician," St. Luke, who, with his emblematic winged bull, is prominently represented in the upper tier of the window. In the middle tier is shown, in a series of subjects, the parable of the Good Samaritan, as especially suited for the memorial of a physician, and additionally so as being a parable recorded by St. Luke only. In the tracery are four angels,—two bearing respectively open books, inscribed "Evangelium" and "Actus Apostolorum;" the other two bearing, in allusion to the medical calling, a skull and a branch of herbs. The work is designed and executed as to style in close conformity with the architecture of the building. The second window is a memorial of Colston, the philanthropist, in the north transept of *Redcliff Church Bristol*, a notice of which we may find another opportunity to give. The cost of it was raised by subscription.

Holy Trinity Church, Preston.—Memorial windows have been put up in the north and south transepts of this church, in stained glass of a grisaille geometrical character. The tracery surmounting each of the openings is filled with foliated work. The windows are in memory of the Rev. C. Robinson, LL.D., for nineteen years incumbent of this church. The cost was 150*l.* They have been supplied by Messrs. Edmundson & Son, of Manchester.

Bath Abbey.—The last addition to the series of painted windows in the abbey is one erected in

the north aisle by the Rev. Prebendary Kemble, to the memory of his son, who died at sea. The idea prevailing throughout the greater part of the design is that of early piety. The family arms occupy the upper compartment in the tracery, and the four small compartments beneath are filled by representations of Isaac, David, Joseph, and Josiah. Each of the lancet lights in the body of the window contains two designs, a larger one and a smaller one, the latter being placed at the bottom. The main subject in the central light is "The Good Shepherd." The two other leading subjects occupy the upper portion of the remaining four lights, "Eli and Samuel" being inserted in the first and second compartments, while in the third and fourth the scene illustrated is Timothy being instructed in the Scriptures by his mother and grandmother. In the lower portion of the window is placed a series of minor designs, three in number. The central one is "Angels raising the Dead from the Deep," which is flanked on the right by a representation of "Elijah raising the Son of the Shunamite Woman," and on the left by the scene of "Our Lord raising the Widow of Nain's Son." The window was designed and executed by Messrs. Clayton & Bell.

Salisbury Cathedral.—A painted glass window has been recently placed in the south transept of this cathedral by Mrs. George Marsh, in memory of her father, the Ven. William Macdonald. The window is the work of Messrs. Clayton & Bell, and in its execution they have observed the characteristics of the various specimens of ancient glass which are to be found in the cathedral, believing that to be the most suitable way of treating the work. The window is divided into five compartments. In the top is the subject, "Noli me tangere." The centre part represents "The Angels and Marys at the Tomb;" and at the bottom of the window is "The Burial of the Saviour."

St. Mary's, Oxford.—The workmen of Messrs. Clayton & Bell, of London, have just inserted, near the principal entrance to this church, a stained-glass window to the memory of the Rev. Isaac Williams, once curate to Dr. Newman, and for many years connected with St. Mary's Church. The design comprises a four-light window, divided with mullions, and the figures in the lights are the four Evangelists, and above them St. Augustine, St. Gregory, St. Jerome, and St. Ambrose. These are surmounted in the scrolls with figures of angels.

DISSENTING CHURCH BUILDING NEWS.

Doncaster.—The Wesleyans of Doncaster are about to build, at a cost of some 7,000*l.*, a new chapel, in St. James's-street, Doncaster, upon a site recently purchased of the corporation for that purpose, and of which Mr. Watson, of Wakefield, is the selected architect. The new chapel will be built in consequence of the existing place of worship in Priory-place having become inadequate to the requirements of the society. The somewhat novel ceremony, so far as a chapel is concerned, of turning the first sod was performed by the Mayor of Doncaster, in the presence of an immense concourse of people. The mayor, who is a churchman, invited the members of the corporation, the ministers of the society, and the building committee, to luncheon at the Mansion House, in honour of the occasion; the Mayor of Leeds being also present. A procession was formed at the Mansion House, headed by the band of the Third West York Militia, the mayors of Doncaster and Leeds, the mace-bearers and police leading, and followed by the corporation, some of the officials of the borough, members and ministers of the Wesleyan society, and about 900 Sunday-school children. A silver spade was presented to the Mayor of Doncaster, with which he performed the ceremony of the day. The chapel is to be built by Mr. Harold Arnold, of Doncaster, and when completed will accommodate 1,000 people. According to Mr. Watson's design, the building will be in the Italian style. It will be erected at the top of the new street now forming in Crowther's-garden, and will face St. James's-street. At each side will be a space of 46 ft. wide. On the right-hand side will be built the boys' school, and on the left the school for the girls and infants. The front elevation and also return staircase wings, will be of stone, having circular-headed doorways and windows on the ground floor; and above, in the centre, there will be a large traceried circular-headed window, which, in all probability, will be filled with stained glass. The extreme size of the chapel building will be 57 ft. 4 in. wide by 107 ft. long. This will include large band-room, ministers' vestry, and other offices on the ground floor at the rear. A gallery will run round both sides and one end. The chapel will be built with a clearstory, which will have seven circular lights on each side, and the clearstory walls will be supported by cast-iron columns and wrought-iron girders, the former also supporting the side galleries. The ground floor and gallery will be filled with stalls; and all the woodwork will be executed in red deal, stained and varnished. The schools on each side are designed to accord with the chapel. The front facings right and left will be of white bricks, with red arches, bands, and other ornamental features. Each school will present a frontage of 85 ft., and each will afford accommodation for 250 children. The tender supplied by Mr. Arnold, of Carr-lane, was for 5,262*l.* Though not the lowest, the committee took into consideration the fact that Mr. Arnold was the owner of the land adjoining their site, and as he was anxious to serve them by erecting near their new chapel houses of first-class appearance, the committee entrusted to him the contract for the building. The total cost of land and building will be a little short of 6,500*l.*

Lightcliffe.—The general committee of the proposed new Congregational chapel has had a meeting, Sir Titus Salt presiding, when the plans for the new church were submitted, after having undergone several alterations. The tower and spire will be 130 ft. high, and the design is Gothic. In the rear of the church a minister's house will be built, in a suitable style to the other building. The total cost, including everything, is about 4,800*l.* The plans were adopted, and Messrs. Lockwood & Mawson, of Bradford, will commence the work as early as possible.

Wokingham.—The foundation-stone of a new Wesleyan chapel has been laid in this town, on the site of an old building. The new chapel will be built by Mr. Whiting, of Reading, from plans prepared by Mr. T. S. Lansdowne, architect, Swindon. The shape of the building is a parallelogram, and it will be composed of red brick, with Bath stone dressings. The roof will be open timber, built diagonally, boarded, stained, and varnished. The seats will be open, stained, and varnished. The style is the fourteenth century Gothic, and the street front will contain three gables, with centre porch, and the roof will be supported on stone corbels. The dimensions are 51 ft. by 33 ft., and there will be accommodation for 350 persons. The cost is about 1,000*l.* It is intended to erect a schoolroom, which will increase the cost to 1,400*l.* The late Mrs. Heelas had given 400*l.* to the building fund, and Sir Francis Lycett, who has contributed to various other Wesleyan chapels in different parts of the country, has given 25*l.* A coloured drawing of the new chapel, by the architect, was exhibited in the Town Hall.

FROM SCOTLAND.

Bonnyrigg.—At a special meeting of Commissioners of Police for the burgh of Bonnyrigg a previous resolution was confirmed "to lease or rent a piece of ground near the burgh, to be used as a pleasure-ground, or place of resort or recreation, in terms of the General Police and Improvement (Scotland) Act, 1862." The park, which is situated on the farm of Polton East Mains, and in close proximity to the burgh, measures 5·27 imperial acres. A lease of ten years, from Martinmas, 1869, is proposed, at the yearly value of 14*l.* 10*s.*; the estimated cost of inclosing the park and effecting other improvements is 72*l.* 10*s.* The total outlay is computed to amount to 100*l.*, and it is proposed to be paid in yearly instalments by an assessment of 1*d.* per pound, which would liquidate the cost in six years.

Glasgow.—The foundation-stone of a new bridge, to be called the Albert-bridge, has been laid at Hutchesontown, Glasgow, by the Earl of Dalhousie, as Grand Master of Freemasons.

Stirling.—The late Mr. Thomas Smith, of Glassingall, who died lately at Avignon, has bequeathed 5,000*l.* for building a museum, picture and sculpture gallery, and artisans' reading-room and library, in Stirling, for the district, with nearly 500 oil paintings, water-colour drawings, and articles of vertu, valued at 6,000*l.*, and 14,000*l.* to endow the institution.

Paisley.—The new scheme for an additional supply of water to the town of Paisley has been inaugurated. A number of gentlemen proceeded to the new filters at Stanely, which is situated immediately below the Braes of Gleniffer, and the provost there formally turned on the water. This extra supply is secured from a large reservoir at Nethertrees, about seven or eight miles from Paisley, and the water is conveyed by gravitation to the filters at Stanely, about three miles from the town. The top of the receiving-tank at the Stanely filters is placed about 10 ft. higher than the top of the High Church steeple, which is erected on the most elevated part of Paisley. The reservoir, when full, will contain 77,000,000 cubic feet, extends over an area of 100 acres, and the maximum depth is 35 ft. The whole scheme is estimated to cost 77,000*l.* The Water Commissioners will be able to pay the interest of the money without increasing the public rates.

Nairn.—Extensive alterations and additions to the Nairn Sheriff Court-house and County Buildings have just been completed. A range of buildings has been added in the rear of the original edifice, which comprises debtors' rooms, prison store-room, new cell accommodation, and the prison governor's house. The exterior of the building has also been improved. A new clock has been placed in a spire.

Dundee.—Recently a movement was commenced by Provost Yeaman, with the view of getting the Old Steeple repaired and renovated; and a numerous meeting of gentlemen, who had been requested by the Town Council to aid in the matter, has been held in the Town Hall. The Town Clerk read letters which he had received from the Earl of Airlie, the Earl of Strathmore, the Earl of Southesk, Lord Wharncliffe, Lord Kinnaird, Sir John Ogilvy, M.P., Mr. Armitstead, M.P., and others, expressing their readiness to have their names placed on the committee, and to assist in defraying the expense of the work of restoration. Resolutions approving of the efforts now being made for the purpose of repairing and restoring the steeple in accordance with its original style of architecture, and agreeing to take the advice of Mr. Robert Mathieson, Assistant Surveyor of Woods and Forests, as to what is necessary to be done, were unanimously agreed to. The Old Steeple is supposed to have been erected during the fourteenth century.

Perth.—The foundation-stone of the new church in Tay-street, for the Free West congregation, Perth, has been laid by the Earl of Dalhousie. The design for the new structure was prepared by Mr. J. Honeyman, jun., architect, Glasgow. The building was commenced in the autumn of last year, and considerable progress has since been made. The site is about midway between the Post Office and the County Buildings, on the line of Tay-street. The structure will be in the style of church architecture which prevailed in the middle of the thirteenth century in France and other Continental countries. The length of the building, exclusive of the vestry and the proposed Presbytery Hall, is 114 ft., and the width 63 ft. The main entrance to the church will be in the base of the tower, fronting Tay-street and the river, the lower part of the tower forming a porch. The tower will measure 30 ft. over the buttresses, and the height from the pavement to the top of the spire will be 212 ft. The church will be divided into three aisles by iron columns supporting the sides, galleries, and roof. The ceilings will be plastered, but the principal couples, which are very ornamental, and the purlins will be exposed to view. The height of the centre aisle from floor to ceiling will be 43 ft. Provision will be made for ventilating the church by drawing the vitiated air into the tower. The pews will be 33 in. wide, affording a space of 20 in. to each sitter. Accommodation will be provided for upwards of 1,000 persons; and it is understood that the total cost, exclusive of the site, will be about 8,000*l.*——The opening of a new Roman Catholic church, dedicated to Our Lady of Perpetual Succour, in connexion with St. Mary's Redemptorist College, Kinnoull, Perth, has taken place. The new church is immediately to the north of the collegiate buildings, which, together with the church, were designed by Mr. Heiton, architect, Perth. The church is in the Early English style.

Inverness.—The new public markets have been formally opened by the magistrates and town council. The building has been about a year in course of construction, and is erected on the open space where the markets were formerly held. The site is central, the main front being in Academy-street, directly opposite the railway station, while at the extreme end there is an entrance from Church-street, and there is also a

side gateway into Union-street. The whole building is easy of access. The cost of erection was about 3,000*l*. The architects were Messrs. Matthews & Lawrie, of Inverness and Aberdeen.

Rothes.—The foundation stone of a spire, which will be furnished with a clock, has been laid in Rothes. The ceremony was performed with Masonic honours. The carpenters' society, and the children attending the various schools in the town, took part in the procession, and the Volunteers acted as a guard of honour. The work has been instituted by the Rev. George Gray, of the parish church, on which building the spire will be erected. The cost is estimated at 300*l*.

Greenock.—Serious damage has been done to the new works of the Greenock Water Trustees at the Gryfe, the repairing of which it is estimated will cost fully 2,000*l*. It is stated that the masonry of the wall was not sufficient to withstand the weight of the embankment behind it, and was forced in, and that the embankment will have to be cut out, and the tunnel rebuilt.

Books Received.

A Guide to the Construction and Management of Workhouses: together with the Consolidated Order as amended by subsequent Orders of the Poor-law Board. By EDWARD SMITH, F.R.S., &c., Medical Officer of the Poor-law Board, and Poor-law Inspector. Knight & Co., Fleet-street. 1870.

DR. SMITH has here prepared a Guide which, in a compendious form, includes sanitary, legal, and general observations, and supplies the requirements of the local executive on all the duties which devolve upon them.

The Consolidated Order has been printed as the third part of the work, and those clauses which have been amended or superseded by subsequent orders of the Poor-law Board have been indicated and altered.

The increased attention which has recently been given to this subject has led to improved administration, with an expenditure of very large sums of money, and has induced the Poor-law Board to express their views on certain subjects more definitely than heretofore, by the issue of "Instructions" and "Suggestions," all of which are printed in this work, and will be at hand for reference.

Architects have long desired such "Instructions" when preparing plans; and we may expect that those officially issued, with the remarks upon the selection of sites, and the arrangement of the different blocks of buildings constituting the workhouse, which are given in this book, will lead to the saving of time and expense in the performance of that duty.

The instructions on the site, drainage, and water supply, construction, and arrangements of workhouses, are full and detailed, and constitute a chapter of the book in themselves.

The Mystery of Edwin Drood. By CHARLES DICKENS. Parts I., II., and III. London: Chapman & Hall.

THE last chapter of this tale published closes with the sentence,—"And thus, as everything comes to an end, the unaccountable expedition comes to an end—for the time." Little thought the thousands who read it that the expedition of the great novelist himself had come to an end,—here; that the busy brain that was evolving the mystery about which were clustering new acquaintances, and through which fresh insights to man's heart were to be gained, would work no more,—that a dear friend, though possibly unknown in the flesh, had passed away, and that Charles Dickens would write no more. The universal opinion as to the value of his works has been shown by a wide burst of sympathy, and it is not too much to say that England and America feelingly weep his loss. More than one strange coincidence with reference to his death has been mentioned, notably the circumstance that dying, as he did, on the 9th of June, 1870, on the 9th of June, 1865, he most narrowly escaped death on the South-Eastern Railway. It is a small circumstance, still it is cognate, that the first advertisement in each of the published numbers of "Edwin Drood" is one of "mourning," surrounded with a wide black border.

Concerning the remainder of the work, the publishers have in type something more than enough for three numbers, in the whole rather more than half the work. It was at first thought that Mr. Dickens had left a rough scheme of the complete work behind him, but at present this has not been found, and we believe we may state that no attempt will be made by another hand to finish it. It may interest some to know that more than 50,000 copies were sold of No. 1, and that the steady sale, judging from that of the after numbers, promised to be 40,000.

All our readers, doubtless, by this time, have heard that on Tuesday morning last, early, and quite privately, the remains of our great novelist were buried in Westminster Abbey. The grave is in Poets' Corner, at the foot of Handel's, the head of Sheridan's, and between Lord Macaulay and Cumberland, the dramatic poet. A few feet removed, and near to the side of Dickens, but towards his feet, lie Johnson and Garrick, while near them repose the remains of Campbell. The statue of Addison and the bust of Thackeray overlook the grave at its head: Shakspeare's monument is not far from its foot, and Goldsmith's monument is on the left.

VARIORUM.

We are glad to learn that the "Photographic Art Journal" is about to give up its second-hand title, to which we objected on its first appearance, and is about to appear with a new one in a fresh form. No. 4 includes a clever reproduction by the Woodbury process, of a painting called "Le Favori du Roi," by a rising Spanish artist, M. Zanaivis, and one of a beautiful study of heads and hands by Raffaelle.——Mr. Bailey Denton has published in a separate form (through Messrs. Spon, Charing-cross), his paper on "Sewage Farming," with remarks on the position of sewer authorities in relation to lands to which sewage is applied, first read before the Central Farmers' Club in March last.——"Report to the Tottenham Local Board of Health on the Disposal of the Sewage of their District, May, 1870. London: Spon." The Committee who so report have, after considerable investigation and trouble, come to the conclusion that irrigation is the best mode of disposing of sewage. They deprecate the idea that sewage farms are "miasmatic fields," "putrid quagmires," or anything of the sort; and assert, on the contrary, that as a rule the mere visitor would not know that he was on a sewage farm at all. They have had no difficulty in finding land wherewith to commence sewage farming at Tottenham.——"The Tenth Annual Report of the Amalgamated Society of Carpenters and Joiners, from December, 1868, to December, 1869. Kenny, Printer, Camden-road." From the remarks of Mr. Applegarth, the general secretary, it appears that, notwithstanding the continued depression of trade, the operations and progress of the society have been highly satisfactory. The increase made in members and funds, however, is not equal to that of 1868; but the increase made, the suffering and distress relieved and prevented, and the quiet useful work done, are said to furnish cause for congratulation. After meeting an exceptionally heavy expenditure, there is a balance of 446*l*. 18s. 5½d. out of the year's income. The society has admitted 569 new members, and opened seventeen new branches, five of them in the London district, four of which were old-established local societies.——"The Nineteenth Annual Report of the Amalgamated Society of Engineers, Machinists, Smiths, &c., for 1869. Kenny, Camden-road, Printer." The general secretary, Mr. W. Allen, states that he has to record a very large diminution in the funds; indeed, so much so that, notwithstanding the fact of their income having amounted to no less a sum than 82,406*l*. 13s. 2½d., their expenditure has exceeded that amount by 22,521*l*. 14s. 4½d., the total expenditure for 1869 having been 104,928*l*. 7s. 6d., or 4,881*l*. 11s. 5d. less than in 1868. This large expenditure has entirely resulted from the lengthened depression of trade experienced not only in the United Kingdom, but in our Colonies and the United States of America—such a depression as the society have never encountered before, and which is attributed to the unsettled state of commerce in the country, and want of confidence generally in the trading community. However, although they have had three years of unprecedented bad trade, the society has been enabled to meet all its engagements, and still be in possession of a large reserve fund at the close of 1869. On the last meeting night in 1868 the balance in hand amounted to 98,699*l*. 2s. 1½d., to which must be added the income for 1869, namely 82,406*l*. 13s. 2½d., making in all 181,105*l*. 15s. 4d., from which sum is required to be deducted 104,929*l*. 7s. 6d., the total expenditure, leaving a net balance of 76,176*l*. 7s. 10d. During the twelve months the society have paid as donation to unemployed members the sum of 59,980*l*. 7s. 1½d.; to sick members, 17,777*l*. 18s. 10½d.; to superannuated members, 8,055*l*. 17s. 8d.; in sixteen cases of accident, as per 23rd rule, 1,600*l*.; and for funeral benefit, 5,600*l*. 8s. 2d.; being in all 93,014*l*. 11s. 10d. paid in support of the five principal benefits of the society, or 2*l*. 15s. 5½d. per member.——"Notes to accompany a Series of Photographs designed to illustrate the Ancient Architecture of Southern India. Taken for Government, and described by Captain LYON. Edited by JAMES FERGUSSON, F.R.S. London: Marion & Co."—In these Notes are described, according to the Preface, nearly all the temples worthy of a visit in the South of India. The Notes are given gratis to the purchaser of ten of the photographs. The text has been revised and corrected by Mr. Fergusson.——"Plan for conveying Railway Trains across the Straits of Dover; showing the Origin of the Idea. By Evan Leigh, F.S.A. London: Longmans & Co." The author of this pamphlet says, in the outset,—

> "In the year 1861, I first conceived the idea of conveying railway trains across the Straits of Dover, and took out a patent for it, connected with some other nautical matters. In the following year I exhibited my patent ship in London to the Lords of the Admiralty and a number of other scientific gentlemen, including Mr. Scott Russell, having been introduced to most of them by Rear-Admiral Denman. After this I sent my models to the Great Exhibition of London in that year, and distributed hundreds of lithographs, with a printed description of my new ship, showing how railway trains might be conveyed across the Straits of Dover or other narrow seas. A great amount of curiosity was excited at the novelty of the idea, this being the first that was proposed."

Mr. Leigh appears to have since improved his scheme. The paddles are protected, by being inserted amidships and not at the sides, and the form of paddle is like that of water-wheels. There are no chains for the trains to be dependent on; and as the boat will not draw more than 7 ft. or 8 ft. of water at most, with train and coal on board, if made without pontoons, and only about 12 ft. with them, it would be unnecessary to change the present route, *vid* Calais, Boulogne, or any other port.

Miscellanea.

Moving a Windmill Entire, for Sixteen Miles.—A novel experiment, though not quite so sensational as the moving of a hotel at Chicago, has been the removal of a wind flour-mill, with all its fittings, from Westacre to Clenchwarton, Norfolk. The mill is a wooden structure, and, with its machinery, of enormous weight. It stood upon wheels, and having been purchased by a man living at Clenchwarton, he determined to endeavour to draw it along the road by a traction-engine, but all efforts to find one strong enough proved ineffectual; the application, however, of a powerful steam cultivation engine proved more successful. In passing along the route various expedients had to be tried, such as in ascending a hill the engine proceeded to the summit, and then pulled the mill up with a chain, and so carefully had the task to be performed, that it occupied three days to make the journey. In crossing the Ouze, it was feared the celebrated long bridge would not be strong enough, but the engine having first passed over, the mill itself was drawn over, the bridge timbers creaking.

Projected Improvements at the County Gaol, Chelmsford.—The Committee of Justices appointed to carry out the enlargement of the cells in the two old wings of the county gaol at Springfield, and to alter them so as to correspond with the cells occupied by the female prisoners in the other wing, have met to examine the tenders sent in for carrying out the works. The following tenders were opened, the lowest on the list being accepted:—Adamson, 5,726*l*.; Munday, 5,500*l*.; Capon, Manningtree, 5,300*l*.; J. Grimes, 5,039*l*.; Wells, 4,700*l*.; J. Brown, 4,650*l*.; Runnicles, 4,547*l*.; Parmenter, 4,515; Saunders, Dedham, 4,430*l*. (accepted).

The Architectural Association.—At the ordinary meeting, on the 3rd of June, Mr. T. Blashill read what was entitled "A Paper on Papers," the principal purpose of which appeared to be to urge young men to work rather than to read, and to acquire knowledge practically instead of taking it up second-hand.

To See Down a Well.—The New Hampshire *Journal of Agriculture* suggests an excellent plan for exploring the bottom of a well:—"It is not generally known how easy a matter it is to examine the bottom of a well, cistern, or pond of water by the use of a common mirror. When the sun is shining brightly hold a mirror so that the reflected rays of light will fall into the water. A bright spot will be seen at the bottom, so light as to show the smallest object very plainly. By this means we have examined the bottoms of wells 50 ft. deep, when half full or more of water. The smallest straw or other small object can be perfectly seen from the surface. In the same way one can examine the bottom of ponds and rivers, if the water be somewhat clear, and not agitated by winds or rapid motion. If a well or cistern be under cover, or shaded by buildings, so that the sunlight will not fall near the opening, it is only necessary to employ two mirrors, using one to reflect the light to the opening, and another to send it down perpendicularly into the water. Light may be thrown fifty or a hundred yards to the precise spot desired, and then reflected downward. We have used the mirror with success to reflect the light around a field to a shaded spot, and also to carry it from a south window through two rooms, and then into a cistern under the side of a house. Half a dozen reflections may be made, though each mirror diminishes the brilliancy of the light. Let any one not familiar with this method try it, and he will find it not only useful, but a pleasing experiment. It will, perhaps, reveal a mass of sediment, at the bottom of a well, that has been little thought of, but which may have been a fruitful source of disease, by its decay in the water."

The "Clameur de Haro."—The States of Jersey gave the English railway company that is forming a line between the towns of St. Heliers and St. Aubin the site of the slaughter-houses at the head of St. Heliers Harbour for the erection of a railway station. The grant, however, was attended with certain conditions respecting the providing of suitable accommodation for slaughtering. The contractor had proceeded to abolish the buildings without complying with the necessary conditions, when Mr. David de Quetteville, one of the judges of the Royal Court, proceeded to the spot, and raised the *Clameur de Haro*, which consists in the person raising it falling on his knees and crying out, "*Haro! Haro! A l'aide, mon prince, on me fait tort!*" The workmen immediately desisted, as they were bound to do under a heavy penalty, and the work was stopped. A special meeting of the States (the Island Parliament), was convened, and it was resolved, after a stormy discussion, to prevent any further proceeding with the work until a satisfactory agreement had been made with the company for the erection of new slaughter-houses.

The Prehistoric Remains at Dartmoor. At a recent meeting of the Ethnological Society, Mr. C. Spence Bate presented a "Report on the Prehistoric Antiquities of Dartmoor," forming one of the series of reports being now collected by the society with a view to obtaining accurate information on the present condition of the megalithic monuments of this country. After noticing the physical features of the district, the author described in detail the numerous stone circles, avenues, menhirs, cromlechs, cairns, and other prehistoric monuments of Dartmoor. He suggests the idea that the stones in some of the avenues may have been erected in commemoration of the death of persons of distinction, one being added for each burial. The depressions on the summits of some of the cairns were regarded rather as indications of unfinished work than of subsequent disturbance by treasure-seekers. Evidence was adduced of the wanton destruction of the granite blocks in some of the cromlechs; and both in the paper and in the subsequent discussion attention was directed to the importance of extending legislative protection for these prehistoric monuments.

Telegraphic Communication.—It is understood that application has been made for letters patent for constructing a cylindrical iron kerb for reception, repairing, and maintaining telegraph wires, to be of the same external form and size as the stone kerb now in use. Should this, in the opinion of practical men, be available, it must be a means of extending telegraphic communication, and prove of great public utility and economy, by preventing the constant necessity of taking up the roadways and pavements.

Palmyra and Tadmor.—The wife of Capt. Burton, the traveller, writes to the *Morning Post*, from Damascus a pleasant letter about the East. She states that the road to Palmyra and Tadmor is now open to European travellers. She has visited them, and says that Palmyra is only worth visiting if some days can be given to it, especially to examine the old Palmyrene tomb-towers which there represent the pyramids. Old Tadmor and its vicinity it would not be difficult, she thinks, to revive and cultivate when there is protection for life. Speaking of the tomb-towers, Mrs. Burton says:—"There are three tomb-towers which still may yield results; the people call them Kasr el Zayneh (pretty palace), Kasr el Azba (palace of the maiden), and Kasr el Arus (palace of the bride). Explorers, however, must bring ropes and hooks, ladders which will reach to 80 ft., planks to bridge over broken staircases, and a stout crowbar. We had none of these things. I have little doubt that the upper stories still contain mummies, tesseræ, and other curiosities. We made sundry excavations, but we lacked implements, and our stay was not long enough for good results. The march from Damascus to Palmyra may be done in four days by strong people well mounted, as we did on return."

The Derby Memorial.—The Grocers' Company will subscribe 100*l.* to the fund now being raised for erecting a statue of the late Earl of Derby. A general meeting of the subscribers to the memorial in the former parliamentary division of North Lancashire was recently held at Preston. The amount promised is 1,560*l.* 13*s.* The sum actually received in subscriptions is 1,183*l.* 16*s.* The chairman said he had received the consent of the Duke of Devonshire to form a committee. He also stated that he had seen Mr. Foley, the sculptor, who said that the cost of the statue would be about 1,200*l.* It was resolved unanimously to adopt the recommendation of the general committee that the testimonial should take the form of a statue. The statue committee is to consist of the Duke of Devonshire, Colonel Patten, Colonel Greene, Lieut.-Colonel Crosse, and Messrs. Holt, Harkie, Sharp, and Parker. It was resolved that the statue should be placed either in Lancaster or Preston.

Opening of the Darlington Polytechnic Exhibition.—The collection of the productions of art and science, now being exhibited in the Mechanics'-hall, Darlington, is valuable and extensive. The objects which claim and receive chief attention are the paintings, which, though not properly a legitimate element in the collection, are additions and attractions which the committee secured. Among the results of the labours of skilled mechanics are an oak and elm Gothic sideboard, and other articles of furniture worth exhibition; specimens of graining and panelling; an electro-magnetic apparatus for working the block system on a railway; a model of a revolving fort; McDermid's patent paper-hanging machine; &c. The opening ceremony took place under the presidency of the Mayor of Darlington.

Fire at Westminster Bridge Station.—On Monday night a fire broke out at the booking-office of the Metropolitan District Railway Company, at their Westminster Bridge Station. The cause is at present unknown, but the fire spread very rapidly, until the whole of the wooden building was in flames. The booking clerks were able to leave the place without injury. The fire was fortunately confined to the office in which it originated, and which was almost destroyed. The exemption from the provisions of the Building Act at present enjoyed by railway companies is opposed to the public safety.

The Mansion-House Terminus.—"A Citizen" suggests as a compromise that the Metropoliten District Railway Company should be allowed to bring their line up to the Cannon-street end of New Earl-street, making their station on the angular piece of land on the east side thereof, and bounded by Bow-lane, thus absorbing the block of buildings (a great portion of which is at present unoccupied), and which presents such an awkward break of the line of the new street. The suggestion is worth consideration.

Permanent Photographs.—Mr. Woodbury's patent for printing photographs by a permanent process, has been purchased by Mr. Vincent Brooks, of Gate-street, Lincoln's-inn-fields.

Eastbourne.—The president of the college, the Duke of Devonshire, has determined to take steps for the immediate erection of the permanent buildings. The site selected is Larkfield, on the slope of the Southdowns and near the sea. The land immediately surrounding it has been assigned to the college for cricket-fields, &c. The position and soil are all that could be desired. Mr. Henry Currey, architect to the Duke of Devonshire, will have the management of the buildings.——The opening of the pier by Lord Edward Cavendish has taken place. The ceremony was marked by considerable pageantry, including a procession. A banquet took place in the evening, at which Lord Edward was present.

Manufacture of White Lead in America. It is estimated that at least 40,000 tons of white lead were produced in the United States last year, and of this fully one-third by four establishments in Brooklyn. The largest corroding works in the country are in this city. It is further estimated that about 700 tons of lead in oil were imported in 1869, and about 1,500 tons dry. The amount of pig lead consumed in the United States the same year was over 30,000 tons, nearly all of which, as we have stated, is imported. The actual capital invested in the corroding business alone cannot be much less than 30,000,000 dollars, and fully 5,000 hands are regularly employed. If we look at the business incidental thereto, such as grinding, colour-making, and selling, the proportions of this industry are vastly enlarged.

His Royal Highness the Prince Consort's Prize of Twenty-five Guineas.—This prize has been awarded by the Society of Arts to Edward Turner Sims, jun., aged twenty-two, of the Southampton Athenæum, clerk, who has obtained the following first-class certificates:—

1867. Arithmetic—First-class Certificate.
" Political and Social Economy—First-class Certificate.
" Geography—First-class Certificate.
" English History—First-class Certificate.
1868. Book-keeping—First-class Certificate.
1869. English Literature—First-class Certificate.
" Logic and Mental Science—First-class Certificate.
1870. Metric System—First-class Certificate.

Worcester Cathedral Restoration.—Mr. Scott (the architect) having examined the plans and revised the estimates, finds that 15,000*l.* further expenditure will be required to complete the restoration of the cathedral. Towards this sum Lord Dudley offers 5,000*l.*, conditionally on 10,000*l.* being raised by the city and county of Worcester. The dean and chapter, in their official capacity, will contribute 2,000*l.*, so that there will still be left 8,000*l.* to be provided by the public, in order to be in a position to accept Lord Dudley's offer. Lord Lyttleton and Sir J. Pakington have made suggestions as to raising the required amount.

Another Discovery in Palestine.—An important discovery is said, by the *North German Correspondent*, to have been made at Jerusalem. It is an old stone, bearing the figure of a god sitting on a throne, with priests on both sides, and a Hunyaritish inscription two lines in length. It was brought from Yeman, and was offered for sale. Dr. Oscar Meyer, the Chancellor of the North German Confederate Consulate, obtained an impression, which is at present in the hands of the Confederate Consul, Dr. Blau, who is residing for a time at Berlin. The inscription is said to contain the name of "Athtar," or Astarte.

Suffocation in a Well.—A labourer has been killed by foul air while being lowered into a new well in course of being sunk at the new asylum, Longdales, Bothwell. Water had been found at a depth of 57 ft., and for two or three days the well remained closed. The man was lowered with his foot on a rope attached to a windlass wrought by two labourers. As the apparatus neared the bottom, these two men heard him shouting, and asked what he wanted. No answer being returned, they raised the rope, and were shocked to discover his dead body hanging head downwards.

Cordova International Exhibition, 1870-71.—An exhibition of works of art, manufactures, produce, &c., will take place at Cordova, from October 15th, 1870, to January 15th, 1871, under the management of a board of directors appointed by decree of the national government, dated December 9th, 1868. In addition to the contributions of native exhibitors, certain manufactures are specially invited from foreign countries.

The Bath and West of England Show.—The Exhibition of the Bath and West of England Society has been held at Taunton. The arts department comprises some illustrations of metal work, with reproductive copies of the more remarkable specimens from both public and private collections in this country, and other parts of Europe. The Kensington Museum contributes, as it did last year, some specimens in majolica. Several classes of pottery are included in the contribution. A portion of a case is set apart to illustrate the application of the fine arts to the chief manufactures of France. Patent Roman tiles for roofing, patent ridge tiles, and patent eave tiles are exhibited in the open grounds; and Messrs. Searle & Son, builders, Bridgwater, have erected for the exhibitors, in red and grey moulded bricks, covered with tiles, an ornamental model cattle-shed.

The Oxford Architectural Society.—An excursion to Somerton, North Aston, Steeple Aston, and Lower Heyford, has taken place. The party were received at Somerton, by Mr. Wing, of Steeple Aston, who assisted in pointing out the principal objects of interest there, and at North and Steeple Aston, where the party were received by the Rev. J. H. Brookes, the rector, who hospitably entertained them at the Rectory, and exhibited the well-known examples of the fourteenth-century needlework belonging to this church. Rousham was next visited, though the time remaining was so short as to allow of little more than a glance at the church, though the party were kindly invited to pass through the grounds of Rousham, on their way to the station.

Longhope Church.—The spire and upper part of the tower of this church have for some time past been in a dilapidated condition; the belfry floors were decayed, the bell carriages unsafe, and the bells for a long time have preserved an enforced silence. The vicar and churchwardens therefore took the matter in hand, and have placed the edifice in safety. The spire has been taken down, together with the tower to the ringing-floor; the stonework has been rebuilt, and the tower furnished with crocketed pinnacles. The work has been executed by Mr. Organ, of Mitcheldean, under the superintendence of Mr. Maberley, architect, Gloucester.

Electricity in Thrashing.—"R. T." says,—Electricity will open and expand loose fibrous substances. The beautiful rose will partly unfold itself. Why not the husk of corn which envelops each grain be made to open? I presume a slight application of a brush or stick would drop every grain; steam-thrashing would then be an operation of the past. I was led to form this idea by the appearance of a Blue-coat school-boy partaking of a long and strong dose of electricity; his short hair stood upright,—he resembled a young porcupine astonished at a bugbear!

A New Gate.—A novel invention in the shape of a self-acting gate has been introduced, the construction of which is simple and ingenious. In driving up to the entrance the carriage-wheel passes over an iron, so connected by an underground rod with the hinges of the gate, that the latch end is elevated, and the top so inclined that the gate swings open by its own weight. The carriage in passing runs over a second wheel-iron, which causes the gate to close and securely latch. The movement is attended with no delay.

Electricity Utilised.—At the last exhibition of the American Institute, there was seen an elliptic lock-stitch sewing-machine, driven by a small electric engine, which might easily be put into a common hat-box. A series of eight magnets are set on the periphery of a circle, and around these revolves an armature of steel, which is continuously propelled by the magnetic action, and thus operates the machinery that moves the needle. The current may be cut off entirely, or the speed of the needle graduated as may be desired. The inventor is one Charles Gaume.

The Cost of Ink for the Public Service.—Mr. Stansfeld informed Mr. Crawford that the cost of ink annually purchased for the public service was 79,616 gallons of liquid ink, and 169,392 lb. of powder ink, and the cost was 3,212*l.* 6*s.* 6*d.*, of which amount upwards of 1,500*l.* worth was purchased for and paid for by India. The whole amount was supplied by a private contract.

Contemplated New Church at Elmstead, near Colchester.—On Wednesday, the 8th, a meeting of the Building Committee appointed to carry out the contemplated erection of a new church at Elmstead Market, was held at the Bowling Green Inn, in that parish. The plans of Mr. James Stannard, of Leicester, were submitted for inspection, and accepted, the estimated cost of the church being something over 2,000*l.*

TENDERS.

For the erection of nursery, &c., at St. Marylebone Schools, Southall. Mr. H. Saxon Snell, architect. Quantities supplied:—

Nightingale	£1,363 0 0
Bamford & Son	1,329 0 0
Manley & Rogers	1,320 0 0
Hansom	1,319 0 0
Gibson, Bros.	1,274 0 0
Crabb & Vaughan	1,213 0 0
Howard (accepted)	1,189 0 0

For the erection of a house at Putney, for Mr. John Vaughan. Mr. Charles H. Goode, architect:—

Adamson & Sons (accepted)	£1,565 0 0

For a house and office at Tulse Hill, for Messrs. Rickett, Smith, & Co. Mr. Gill, Croydon, architect. Quantities not supplied:—

Garrett	£737 0 0
Bysh	679 0 0
Cressel (accepted)	658 0 0

For the erection of a farmhouse and homestead at Kensal Green, for Mr. Hinckman. Mr. Robert Hutchinson, architect:—

Nutt & Co.	£3,050 0 0
Bunting & Saint	2,994 0 0
Meville	2,928 0 0
Wicks	2,850 0 0
Dowel	2,745 0 0
Harrison & Sons	2,710 0 0
Blease	2,693 0 0
J. & R. Whittaker	2,635 10 0
Wills	2,550 0 0
Thackray	2,500 0 0
Dover & Co.	2,499 0 0
Parsons & Telling	2,499 0 0
Snowball	2,495 0 0
Wicks, Bangs, & Co.	2,490 0 0
Salter	2,375 0 0
Thompson & Smith	2,277 0 0
Bowler & Baxter	2,139 0 0

For the erection of a farmhouse and outbuildings at The Hyde, Kingsbury, for Mr. Aitkins. Mr. Robert Hutchinson, architect:—

Blease	£1,700 0 0
Wicks, Bangs, & Co.	1,680 0 0
Wills	1,599 0 0
Wicks	1,548 0 0
Nutt & Co.	1,500 0 0
Dowel	1,490 0 0
Harrison & Sons	1,478 0 0
Meville	1,470 0 0
Salter	1,460 0 0
Doune	1,398 10 0
Thackray	1,395 0 0
Dover & Co.	1,393 5 0
Willett	1,392 0 0
Thompson & Smith	1,327 0 0
Snowball	1,292 0 0
Parsons & Telling	1,249 0 0
Bowler & Baxter	1,185 10 0

For house at Sevenoaks, for Mr. A. Wilson. Mr. J. M. Hooker, architect. Quantities supplied:—

Anscomb (accepted)	£2,448 0 0

For proposed Union-house at Winchfield, Hurst, Hants. Mr. Edmund Woodthorp, architect. Quantities supplied by Messrs. Welch & Atkinson:—

Brass	£11,414 0 0
Hibbard	11,380 0 0
Nightingale	11,111 0 0
Birch	10,996 0 0
Henshaw	10,985 0 0
Perry, Bros.	10,980 0 0
Hill & Sons	10,980 0 0
Smith	10,600 14 0
Wood	10,000 0 0
Martin, Wells, & Co.	9,876 0 0
Sanders, W.	9,799 0 0
Sanders, F.	9,699 0 0
Bull & Sons (accepted)	9,497 0 0

For offices for the Clerk of the Peace for Kent, at Maidstone. Mr. Martin Bulmer, architect. Quantities by Mr. Geo. Ruck:—

Schofield	£1,540 6 3
Smith	1,281 14 0
Naylar	1,087 0 0
Anscomb	1,045 0 0
Vaughan	1,022 0 0
Avard & Abnett	1,015 0 0
Bridge	998 0 0
Sollett	990 0 0
Wallis & Clements (accepted)	980 0 0

For schools at Belle Isle, Camden-road. Mr. E. M. Whitaker, architect. Quantities supplied by Mr. L. C. Riddett:—

Roberts	£1,494 0 0
Williams	1,465 0 0
Higgs	1,462 0 0
Bridgman & Nuthall	1,450 0 0
Scrivener & White	1,335 0 0

For additions to infirmary, at the workhouse, Bethnal-green, for the Guardians of Bethnal-green. Mr. Wm. Mundy, architect:—

Brown & Sons (accepted)	£653 8 0

For repairs to thirty-seven houses, in Jefferson-street, Bromley-by-Bow, for the British Empire Life Assurance Company. Mr. McDougall, architect:—

Tarrant	£1,519 0 0
Sayer	1,508 0 0
Sharp	1,255 0 0
Pierpoint	1,089 0 0
Stoner	995 0 0
Morley	991 12 6

For surface (pipe) drainage, Teddington. Mr. Thomas Goodchild, architect. Quantities supplied:—

Agate	£909 7 4
Cole	526 2 0
Brown	519 3 0
Slanden	510 0 0
Pizzey	465 0 0
Voss	457 10 10
Blackmore	445 0 0
Keeble	419 0 0
Young	401 10 0
Goodair	390 10 0
Bloomfield (accepted)	388 0 0

For house, Lansdown-road, Tottenham. Mr. T. B. Munday, architect:—

Clayton	£865 0 0
Chapman	770 0 0
Linzell	719 0 0
Hamlin	684 0 0
Shier	695 0 0
Webb	675 0 0
Nightingale	672 0 0
Mayers	666 0 0
Humphreys & Son	650 0 0
Garrud	649 0 0
Wicks, Bangs, & Co.	637 0 0
Harrison & Edwards	620 0 0
Bowler & Baxter	590 10 0
Rest & Brown	577 0 0
Neblett & Son	550 0 0
Whittaker	549 10 0
Hoare & Cleland (late)	535 0 0

For chapel at March, Cambridge. Mr. John Usher, architect:—

Cunven	£2,839 0 0
Nightingale	2,620 0 0
Broadhurst	2,471 10 0
Hutchinson	2,225 0 0

For Cambridge Corn Exchange. Mr. W. J. Bowyer, architect:—

Bardell & Son	£6,300 0 0
Feist & Waters	5,368 0 0
Thorday	5,209 0 0
Hailey	5,073 0 0
Nightingale	4,729 0 0
Bell & Sons	4,415 0 0
Loveday	4,375 0 0
Elworthy	4,325 0 0

For residence and stables, at Bendicote, near Banbury, Oxfordshire. Mr. Thos. M. Lockwood, architect:—

Dover & Co.	£5,781 0 0
Nightingale	5,678 0 0
Franklin & Sons	5,255 0 0
Munday	5,194 0 0
Claridge	4,830 0 0
Davis	4,572 0 0
Kimberley	4,498 0 0
F. & S. Orchard (accepted)	4,399 0 0
Palmer	3,973 0 0

For works, Grand Junction-street, Blackfriars. Mr. A. Peebles, architect:—

Hill & Sons	£2,576 0 0
Myers & Sons	2,415 0 0
Barnett	2,240 0 0
Adamson & Sons	2,226 0 0
Ramsey	2,215 0 0
Fish	2,190 0 0
Manley & Rogers	2,158 0 0
Sawyer	2,100 0 0
Nightingale	2,063 0 0
Patman & Fotheringham	1,988 0 0
Foster	1,942 0 0
Ennor	1,896 0 0

For rebuilding house and shop, No. 29, High-street, Hampstead, for Mr. Barnes. Mrs. F. C. Dyer, architect:—

Hill & Sons	£1,424 0 0
Scrivener & White	1,298 0 0
Manley & Rogers	1,277 0 0

For alterations and additions to Bromley Workhouse, at Locksbottom, Bromley, Kent, for the Guardians of Bromley Union. Mr. W. Lee, architect. Quantities supplied by Messrs. Linsdell & Giffard:—

Marsden	£5,600 0 0
Emmett	5,469 0 0
Garrett	4,848 0 0
Paine & Co.	4,638 0 0
Crabb & Vaughan	4,800 0 0
Armaud	4,696 0 0
Gill	4,729 0 0
Henshaw	4,583 0 0
Hill, Keddell, & Waldram*	4,510 0 0
Tollett	4,477 0 0

* Accepted.

For St. Michael and All Angels' Mission Schools and residence, Woolwich. Mr. J. W. Walter, architect. Quantities supplied by Mr. W. F. Neighbour:—

Myers	£2,762 0 0
Woodford	2,513 10 8
Dove, Bros.	2,475 0 0
Manley & Rogers	2,465 0 0
Winship	2,230 0 0
Shepherd	2,150 0 0

For stabling, coach-house, &c., at St. Alban's, Herts, for Mr. Thos. Paget. Messrs. Henry Jarvis & Son architects:—

Tarrant	£1,681 0 0
Missin	1,487 0 0
Thompson	1,480 0 0
Henshaw	1,447 0 0
Shepherd	1,445 0 0
Gammon & Son	1,385 0 0
Richardson	1,159 0 0